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Ophthalmoscope

A Monthly Review of Current Ophthalmology.

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VOL. X.
(1912)

London:
GEORGE PULMAN AND SONS, LTD.

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THE
OPHTHALMOSCOPE.

A MONTHLY REVIEW OF CURRENT OPHTHALMOLOGY.

Vol. X.—No. 1.] +(*JANUARY 1, 1912.* [Two Shillings.

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ON THE TREATMENT OF SYPHILIS BY "SALVARSAN."*

BY

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For four hundred years mercury has maintained the leading place as the only really trustworthy remedy against syphilis, a remedy which, properly administered, achieves its object in the cure of the patient. Iodide and sarsaparilla, although very valuable, and indeed often indispensable, can only be regarded as auxiliaries in the fight.

It has been recognised that the disease, slow and protracted in its development and course, required prolonged treatment for its cure. Sir Jonathan Hutchinson was the first to lay adequate stress upon the necessity for a long continuance of the treatment by mercury, even in the absence of all manifestations. In France and Germany, and at Aachen especially, where my own work lies, this principle has been carried out in practice with universally accepted results.

The two great discoveries of recent years in this field as regards syphilis, *i.e.*, the demonstration of the spirochæta pallida as the *causa vera* of syphilis, and the invention, if I may so call it, of the Wassermann reaction, have given a scientific basis to our therapeutic methods, which previously had been founded in empiricism.

Moreover, the experimental work of Metschnikoff and Roux, who overthrew the old belief that syphilis was incommunicable to animals, has paved the way for the more modern research work in chemotherapy. With facilities for work upon monkeys and rabbits, Ehrlich has arrived, after many failures, at the now well-known—perhaps too well-known—"606" of his series, the preparation which I propose to make the subject of my remarks to-day.

The first impetus towards the use of arsenical preparations in the treatment of syphilis was given by your countryman, W. Thomas, who obtained good results from the administration of atoxyl in trypanosomiasis. Robert Koch took up this idea, and he was able, in a large number of cases of sleeping sickness, to demonstrate the specific effect of atoxyl against the trypanosoma. But although the immediate effects were very promising, he soon realized that the results were not of a lasting character.

This is a fact which it would have been well to remember when the first exaggerated reports were published of the hardly less than miraculous cures of dioxydiamidoarsenobenzol. The marked effect of atoxyl upon trypanosoma was the reason for trying it in diseases due to spirilla, as Schaudinn maintained that the spirilla were closely related to trypanosoma. This argument proved its accuracy in the spirillosis of chickens, for the spirilla promptly disappeared from the blood upon the administration of atoxyl.

In Russia, relapsing fever was also shown to be favourably influenced by atoxyl, and experiments upon monkeys and rabbits demonstrated its efficacy against the spirochæta pallida. In human syphilis, also, sufficiently large doses gave promising results, but unfortunately the dosage necessary to obtain these good results involved undeniable danger to the optic nerve. An alarmingly large number of cases of blindness appeared in the reports, and eventually precluded the use of this drug in the treatment of syphilis.

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* A Communication to the Oxford Ophthalmological Congress, July, 1911.

No more satisfactory results followed the use of "Arsacetin," no fewer than 5 per cent. to 10 per cent. of the African natives so treated becoming blind. The same discouraging by-effect ensued upon the use of "Hectin," a French arsenical preparation, and, not to omit mention of your own country in this connection, upon the administration of "Soamin."

Still more disastrous in its effect upon the optic nerve was Ehrlich's Arsenophenylglycin. A most fortunate difference manifested itself in Ehrlich's latest preparation, which you have all for some time known as "606." This combines a much lessened toxicity to the organism with undiminished potency against syphilis.

As a medical man engaged for twenty years at a watering-place well-known all the world over for its treatment of syphilis, I have felt it incumbent upon me to acquire all possible information at the principal centres of the new treatment.

Therefore, this address is based upon:

(1) My information upon the literature of the subject, which I have endeavoured to bring up to date.

(2) My personal observations in the centres to which I have referred.

(3) A certain number of my own private cases, in which, for special reasons, I have felt justified in availing myself of it.

It will be easily understood that within the time at my disposal it is quite impossible to touch upon more than the exclusively practical aspects of the question.

The preparation is now sold in small vacuum tubes, containing 0.6 gramme of a light-yellow powder, which is soluble in water as a bichlorate salt. This acid solution may not be used, but must first be neutralized or alkalized by the addition of caustic soda. The acid solution proved to be extremely dangerous on account of its toxicity.

Many methods have been tried in preparing the solution for use. I shall only describe to you the most generally recognized procedures.

"Salvarsan," which is the name given to the drug when it was placed at the disposal of the profession, is now nearly always administered in one of two ways, namely, either by intramuscular or intravenous injection. The subcutaneous method has practically been discontinued, for reasons to which I shall refer later. It is essential that the final preparations of these solutions should be carried out immediately before their use, *i.e.*, actually in the presence of the patient, on account of their early and rapid decomposition into substances of highly toxic character. The same dangers may be created by decomposition resulting from the admission of air, through an unsuspected crack in an *ampoule*.

For intramuscular injection Alt's alkaline solution is the most effective and the most convenient, as has lately been emphasized by Ehrlich himself. The process of making the solution is as follows:

Into a graduated glass cylinder of 100 ccm. capacity, 10 ccm. of sterilized water is poured and the powder added. On brisk shaking, a clear solution results. Next is added to each decigramme of the powder 5 decigrammes of a normal solution of caustic soda. The whole is then shaken again for a minute. At first there results a cloudiness due to a partial precipitation, which, however, clears on further shaking, but if the clearing should be incomplete, it can be effected by the careful addition of a few more drops of the caustic soda. The reduction of the bulk of this solution to this quantity of 10 ccm. or thereabouts, has been made possible by the production of the salt in a more soluble form.

Therefore the methods of Wechselmann and Kromayer, devised for the avoidance of too bulky solutions, have been superseded by the method here described. Wechselmann used a neutral suspension, and Kromayer a mixture of the pure salt with oil or vaseline.

For the intravenous injection, 10-20 c.cm. of water or saline is poured into a cylinder of 200 c.cm. capacity. The "Salvarsan" is added and shaken as before until the solution becomes perfectly clear. Then is added physiological saline to bring the total quantity up to 100 ccm. To each decigramme of the powder is added 7 decigrammes of the normal caustic soda solution and shaken until any precipitate is re-dissolved, any incompleteness in this respect yielding, as in the former case, to the addition of a few more drops of the normal caustic soda solution. Finally, by filling up the cylinder with physiological saline to a total quantity of 250 ccm., the solution is ready for use. The saline must be at a temperature of at least 120° F. in order to bring the final solution approximately up to blood heat, and it is hardly necessary to say that all vessels and solutions must be scrupulously sterilized.

As regards the *technique* of the intramuscular injection, I always inject into the upper-outer quadrant of the buttock, so as to avoid the larger veins, and before actually throwing in any of the fluid, I detach the syringe from the needle and wait a moment, so as to assure myself that the needle has not punctured any large vessel.

For intravenous injection I employ the apparatus constructed by Ernest R. W. Frank in the way you see here.—On a stand, about one metre in height, are secured two graduated glass vessels, each of a capacity of 250 c.cm., one containing physiological saline, and the other the "Salvarsan" solution. A tube from each leads to a two-way cock, with an effluent tube carrying the canula at its other end, and having interposed within a few inches of the canula, a short length of glass tube. By means of the two-way cock, fluid can be passed from either vessel at will.

The tube and canula being first filled with saline, the canula is thrust into a vein without any dissection, the vein being first made prominent by a constricting bandage on the upper arm. If the vein has been properly tapped, blood will show in the glass segment above the canula. After the removal of the bandage, some 10-20 c.cm. of saline is allowed to pass into the vein. If this produces any swelling, the canula must be removed, as it is clear that either the canula has slipped or has transfixed the vein, and it must be re-inserted. Only after assurance that the fluid is entering the vein, may the tap be turned, and the "Salvarsan" solution allowed to pass. After the desired quantity has been introduced, the tap must be turned, and again a few c.cm. of saline let in, for on no account must "Salvarsan" be allowed to extravasate into the subcutaneous areolar tissue, for a reason which I shall explain later.

The arsenic introduced into the system is excreted within a period which varies with the method employed. After intramuscular injections it can be found, according to Loeb, after the lapse of from six to nine months. After intravenous injection, Alt thought that excretion was complete within two days, whilst Tomascewski gave it four to five days. More recently, George Walterhöfer has reported a case in which arsenic was present in the urine after six weeks, and quite lately Loeb found arsenic in the urine and blood even three months after an intravenous injection.

The local reactions also vary with the method. Often intramuscular injection is immediately followed by a dull pain, whilst after the neutral suspension or oil mixture the pain does not set in before the second day. In this respect patients show a marked idiosyncrasy, for different cases injected at the same time with the same solution may experience a very varying amount of suffering (Rumpel).

Some inflammation is almost invariably set up at the site of the intramuscular injection, and this inflammation has a tendency to produce necrosis. In the muscular tissue this process usually terminates in absorption and formation of connective tissue, whilst in hypodermic injections extension of the necrotic process to the surface is not uncommon, and this even after the lapse of three months or more (Braatz[1]).

Clinically, this reaction occasionally shows large indurated swellings, which may extend down from the buttock to the knee, for days restricting the patient from any movement whatever.

"Salvarsan" must on no account be allowed to escape into the needle track, where it is the cause of serious trouble.

Large infiltrations have been seen in the arm after intravenous injections, and even one case of phlegmon has been reported. Obviously, it is an accident as likely to happen after intramuscular as after intravenous injection, and the same sedulous care must be taken to avoid it, by adopting the precaution already described.

As might have been expected with such a differentiated remedy, the injected drug reacts on the whole organism. The study of these secondary reactions was a necessary preliminary to the general use of that remedy. Ehrlich searched for a preparation that beside the property of influencing the spirochætæ (parasitotropically), should have little affinity for human cells, that is, should not act organotropically. As you will see with "Salvarsan," there can be no question of the total absence of organotropic qualities. This, as has been said, was to be expected. Past medical experience shows that "Salvarsan," like all our efficacious drugs, more or less influences the general human cells, and therefore the health of the individual.

Remembering the dangers of atoxyl, we may be inclined to search for manifestations of arsenical poisoning when using "Salvarsan." This, as Jessner very rightly says, is quite wrong. The chemical combinations of a poisonous element can produce quite different symptoms from the element itself. "Iodoform contains iodine, iodoform poisoning is not identical with iodine poisoning."

So also, for example, is the disease of the optic nerve caused by atoxyl quite different from arsenical disease of the optic nerve, for the latter has by no means a bad prognosis compared with the hopeless prospect of atoxyl neuritis.

The reports of cases of death in connection with injections were particularly alarming. But up to the present I can only put down two of these cases to the account of "Salvarsan"; one, indeed, which Ehrlich himself acknowledges, a young man who died of fatty degeneration of the liver and nephritis; and another similar case of Mohr's.[2] In all other cases of death the cause of the fatality lay in the wrong choice of cases. They were cases of people with cardiac lesions, general weakness, or far advanced disease of the brain. Other fatal cases of poisoning have appeared either after injection of an acid solution, or after intramuscular use. It may be assumed that with the application of the intramuscular method, formation of poisonous arsenical compounds may sometimes arise, to which the unfortunate occurrences may be attributed; Ehrlich has himself expressed this view. This is a sufficient reason for me completely to give up the intramuscular method as a routine treatment.

During the intravenous injection the majority of patients have no unpleasant sensations, but a few may feel a peculiar twitching in the teeth. von Notthafft has seen two collapses during intravenous injection, and I have experienced one. Rigor, nausea, headache, and diarrhœa are reported to follow the intravenous injection, the same day, usually within a few hours. The temperature goes up at times to 40°C. (104°F.) The whole reaction runs its course in from five to six hours, and after twenty-four hours is quite at an end.

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[1] **Braatz.**—"Verein für wissenschaft. Heilkunde," Königsberg Meeting, 16th January, 1911.

[2] **Mohr.**—*Münch. med. Woch.*, No. 16, 1911.

With late syphilis, and in latent cases, there is often no sign of reaction. It is the same in the case of repetitions. Lately, at the first injection of recently infected syphilitics I have often observed a want of any reaction. After intramuscular injection, the fever, etc., appears the next day and disappears by lysis.

The circulatory apparatus is in nearly all cases affected, and there is sometimes slowing, but more frequently acceleration, of the pulse, which may last for days. The healthy heart is not injured by one or two injections, but care is always advisable, as cardiac weakness and cardiac defects constitute important contra-indications. Spielhoff had a case of death during the night from cardiac lesion, and with a second patient suffering from a very slight cardiac lesion, the same fate was only prevented by energetic stimulation. Therefore, he advises that intravenous injections should always be made in the morning, so that a possible collapse in the night might not remain unnoticed.

For an explanation of these cases one can refer to Sieskind's observation that the blood-pressure regularly falls after intravenous injections. This sinking is so limited that the healthy circulation is not affected, whilst with a diseased heart or blood-vessels, there is a possibility of such an arterial dilatation that the patient, so to speak, bleeds to death into his own blood vessels, if the tone of his arterial system is not restored again in time by therapeutic measures. A further question is natural, whether with several repetitions of the injections, the healthy circulation may not also become permanently affected. Albuminuria, and passage of casts in the urine (Jadassohn), appear more frequently (Schlesinger, Behring). Geronne saw after intravenous injection in a female patient albumin up to 80% appear for 4 to 5 days.

According to Scholz, Salzberg, and Beck, chronic nephritis becomes worse after injection, whilst Werther and Schlei each observed a case of hæmorrhagic nephritis set in after intravenous injection. The latter observations are derived from Mohr, who saw three cases of severe nephritis, of which one was fatal. The intravenous method was only made use of in one of his cases, and this patient recovered within a few days.

Oliguria lasting several days has often been observed, and even in one case total suppression, which lasted a whole week. Jaundice is a phenomenon which has often been seen.

According to Klausener, it is a question of a genuine hepatogenous jaundice, which sets in regularly twelve hours after the injection, caused by incompetence of the liver and disintegration of the red blood corpuscles. This disintegration is followed by an increase of red blood cells of one to two millions. Without question, to this must be attributed the subjective well-being that has been observed on all sides, and goes along with the frequent considerable increase of weight of weakened patients, which is anyway a well-known quality of arsenic. Against this gratifying result we must put on record that, as with other differentiated remedies, it occasionally reacts on some patients, producing a skin eruption, which usually appears one or two days after the injection. The exanthemata are either like measles or like urticaria in character. Jessner remarks that these exanthemata desquamate

Lesser and Wechselmann noticed, eight to ten days after an intramuscular injection, the appearance of a reaction which was characterized by rise of temperature, nausea, diarrhœa, and, above all, follicular tonsillitis.

A suspicion of pure arsenical poisoning cannot be rejected in all these secondary manifestations, as is proved by the fact that Meyer, Bettmann, Galewski, and others have reported a number of cases of herpes zoster arsenicalis, and that Walterhöfer observed right-sided peroneal paralysis.

Following this, we come to those manifestations in the nervous system, which are at present of great interest. I mean the lesions of different cerebral nerves, especially the optic and auditory, which have been observed in connection with the injections. The first communications came from Finger, who saw in one case, two months after the injection, multiple ocular paralysis and the beginning of left-sided optic neuritis, which did not improve by the use of Hg. and KI. Another female patient, who, it is true, had already had thirty injections of arsacetin, was attacked by optic atrophy on both sides three months after the injection (0,45gr). Further, three months after the injection, he saw paralysis of the rectus externus, and peripheral choroiditis, with central vitreous opacity. Finger, likewise, saw the first three cases of affection of the labyrinth. Since then, according to a compilation by Benario, (Ehrlich's collaborator), 130 cases of affected nerves have been observed. In 49 per cent. of the cases the auditory nerve, and in 43 per cent. the optic nerve, was affected ; the other cerebral nerves, among which the facial, the oculo-motor, and the trochlear are mentioned, being much less often affected.

These observations were, of course, from the first, well calculated to discredit the further use of "Salvarsan," as, without any further investigation, injuries to the nerves similar to those of atoxyl were assumed.

Clinical experiences have not confirmed this, for while the atrophy of the nerves after atoxyl continued without remission, the use of Hg. and KI, or the further use of "Salvarsan," was successful, with the exception of Finger's case, in causing the manifestations to die away, so that to-day the fact seems established that the explanation is a genuine recurrence of syphilis after "Salvarsan." It is quite as certain, that with the "Salvarsan" treatment such relapses of the nerves are much more frequent than formerly. A great many authors therefore accept the fact that the nerve fibres are weakened through the arsenobenzol, and a *locus resistentiæ minoris* is thereby produced, in which the spirochæte can develop.

Ehrlich also believes that as regards these neuro-relapses, it is because, in the narrow bone canals, in which the cerebral nerves pass, spirochætæ can escape the influence of "Salvarsan," on account of there being there only a small supply of blood.

My own view on the subject is, that here it is really a question of nerve syphilis. These nerve affections following "Salvarsan" nearly always occur within the first months after the primary sore. If it were a question of toxic action on the nerves, one cannot see why the toxicity should only show itself with patients having recent syphilis. The best proof is the fact that further specific treatment causes the symptoms to die away. Since the combination of intravenous injection with mercurial treatment, which method is advocated by Ehrlich himself, the frequency of neuro-relapses has diminished remarkably. The mercury seems to be able to penetrate to those microbes that have managed to escape the "Salvarsan" in the blood stream.

On the other hand, I cannot do otherwise than admit some kind of weakening of the nerves, which predisposes them to the recurrence. Still, an irresistible number of observations, such as that of Jansen, point to neurotropic action. He saw, four hours after an injection, irritation of the optic nerve, which lasted three hours. Further, epileptiform fits have not only been noticed in patients who have formerly suffered from brain affections, such as meningitis, but have also been observed by W. Heuser in two cases of brain lues. in its earlier stage. And again, Troemmer reports two cases of polyneuritis in which the extremities were affected.

I do not see why the acceptance of a certain neurotropic action should not agree with Ehrlich's theory of the insufficient sterilization of the cerebral nerves, inasmuch as it is quite possible that the two factors, the weakened nerve fibres and the surviving spirochæte colony contained therein, can together quite well bear the blame of the frequency of the neuro-relapses.

It must be remarked that only a fraction of the bad symptoms are due to the intravenous method, the greater bulk, on the other hand, being due to the intramuscular and subcutaneous methods. Therefore, it may be accepted that occasionally there are formed, in the "Salvarsan" *depôt* in the muscle and under the skin, after intramuscular and subcutaneous injections, uncontrollable poisonous substances, similar to those observed in solutions that have been standing a long time ; or that free arsenic, through its long-continued action, is the cause of damage to the organism. I believe that these deductions will suffice to exclude the intramuscular from being the regular method, and possibly to advocate only the intravenous method in practice.

The effects of "Salvarsan" on the manifestations of syphilis have been conclusively shown. The literature on the subject is already so voluminous that I am quite unable to deal with it in any exhaustive manner here to-day.

Primary sores soon "skin over," if that is an expression which I may use. Within a few days, the spirochætæ disappear from the sore, a result which, by the way, is not uncommon after a single mercurial injection.

Dörr, Iverson, Fulinsberg, Schreiber, and Keisel, are of opinion that this result is more rapidly obtained than after mercury. The average time for the epithelial covering to be complete, varies between four and thirty-four days. Larger primary indurations may remain much longer than this, as reported by Welander and Gemerich.

According to Halberstaedter, Deneke, and Schindler, indurations on the lips are very slowly influenced, or not at all. Guszman says, "Marked indurations disappear more rapidly and more completely under mercurial treatment." Stern, also, was not very well satisfied, and he saw many failures in initial scleroses of the os uteri.

Indolent buboes quickly subside to a small residual swelling, but, as Mulzer says, very rarely disappear entirely. I quite agree, from my own observations, with Gerome, Huggenberg, Mickley, Lesser, and Bayet, that the glands generally remain in an unsatisfactory state.

The macular, lichenous, and acneiform eruptions, as a rule, disappear promptly, as do also mucous patches in the mouth, nose, and throat.

Whilst moist patches of the skin give very good results, dry and infiltrated ones are less influenced. This is especially so with those around the anus and on the perineum. In this situation the induration very often does not disappear at all (Guszman, Bayet).

A good many of our German authorities, Bruhms, Kromayer, Saalfeld, Ledermann, Buschke, Volk, Blaschko, and Lipschütz, deny any superiority of "Salvarsan" over mercury in secondary skin eruptions.

Nocturnal pains in the shins, and headaches, so frequently observed at the time of the first secondary manifestations, yield admirably to "Salvarsan." In tertiary developments good results are generally obtained in ulcerations of the skin and mucous membranes, and in affections of joints and bones.

In most cases manifestations disappear more quickly than under treatment with the combination of iodide and mercury. But it is interesting to observe that so experienced a man as Zieler had only four good results in thirteen tertiary cases. There would seem to be a special efficacy of "606" in those cases where Hg and KI fail altogether, or are followed by frequent relapses. "Salvarsan" has its triumphs in dealing with malignant syphilis, whose characteristic feature is the failure of Hg and I, which instead of doing good, simply weaken the patient and aggravate the symptoms. Here, usually, after "Salvarsan," a complete change in the general condition of the patient sets in. He increases in weight, and the manifestations yield to the drug sometimes in a miraculous way. By no other means can we obtain the same change of metabolism. For none of the different kinds of dietetic and hygienic measures which are used to strengthen the patient, and even the Zittmann (sarsaparilla) treatment, though often giving good results, are comparable with those really splendid cures obtained by "606."

Tertiary syphilis of internal organs, such as gummatous diseases of the liver and intestines, has been favourably influenced by the Arsenobenzol (Gerome and Gemmerich).

Specific diseases of the internal organs, lungs, syphilis of the liver, specific arthritis, as well as kidney lues, are healed (Scholz, Trempel, de Lapersonne, and Levy). I mention one case of initial uræmia in kidney syphilis, where Trempel, by means of a "Salvarsan" injection, saved the patient's life.

Whilst specific iritis is well influenced, (Siesskind, Glück, v. Zeissl, Märtens and Hoffmann), de Lapersonne saw a total failure in irido-cyclitis. The remedy accomplishes least in cases of parenchymatous keratitis. According to Märtens, retinochoroiditis was unfavourably influenced. Becker and others report that they have been able to cure optic neuritis by several intravenous injections. As regards the nervous system, statistics will show what extraordinarily different results have been published.

Alt, Weber, and Michaelis had good results with cerebral syphilis. Oppenheim treated 10 cases. In one there was an improvement, and in a second (meningitis specifica), complete disappearance of the manifestations. He saw improvement six times in cases of specific optic neuritis, and twice, total failure. There was absolutely no improvement in eight cases of spinal syphilis. Above all, there was a failure in cases of endarteritis and paralytic processes of the spinal cord. The same was observed by Rissom. Bindel says, "Whilst the results of the 'Salvarsan' treatment of the skin and mucous membranes are brilliant, I have seen very poor results with the treatment of lues and metalues of the nervous system. On the whole, specific nerve lesions yield better to 'Salvarsan' in the early periods, especially specific meningitis and gummata of the brain."

The action of "Salvarsan" on tabes dorsalis deserves special attention. The concurrent reports that far advanced cases do not become substantially better, need cause no wonder. On the whole, it may be said that material results also in the early stages have seldom been obtained. By a few authors, improvement of the lightning pains and gastric crises is recorded. Isaak noticed the return of the patellar reflex for a short time. Here it might not be amiss to remember Oppenheim's story of a colleague suffering from tabes, who, in the general "606" enthusiasm, after receiving an injection, simulated, under the influence of suggestion, very perfect patellar reflex, which, however, soon disappeared.

In contrast with that, Oppenheim reports the case of a patient, who, in consequence of the injection, suffered from "maddening pains." I myself have seen the same in one case, and acute aggravation in another. All the same, I would like to concede the possible value of making use of "Salvarsan" in the early stages, especially if a positive Wassermann reaction allows the assumption of a deposit of spirochætæ, whose toxins may conduce to the further development of tabes. One can also imagine an influence on a patient suffering from a form of tabetic meningitis, which seems to be, according to Merzbach, Kretschmann, and others, a genuine product of syphilis.

In tabes you cannot promise a success; you can only recommend the patient to try "606," without any guarantee that he will not suffer from the neurotropic effects of the drug. The improvements in cases of progressive paralysis which were first reported by Alt, have similarly never been seen again by anyone else. The recoveries really all refer to patients who were suffering from lues cerebri and simulated progressive paralysis.

As regards the administration of "Salvarsan" to infants suffering from hereditary syphilis, it must be conceded that in those desperate cases which under ordinary treatment would have terminated fatally, the prognosis has been considerably improved.

The reports on the influence of "Salvarsan" on the Wassermann reaction vary with different observers. Whilst the first authors spoke of the almost constant alterations from the positive to the negative reaction, the latest and most experienced declare that it seldom occurs. To make this question clear would need even further observations, which must be undertaken with much material, after the exhibition of "Salvarsan" in identical quantities for parallel cases, and, above all, at the same interval from the end of the injection. Concerning the significance of the Wassermann reaction as regards the patient, we have not yet come to any agreement. This much is certain, that in practice the positive reaction always proves that the patient has been infected with syphilis. Everything seems also to indicate that it is only found to be positive if the patient is still a bearer of spirochætæ. But it is worthy of remark that it need not turn positive, even if spirochætæ are certainly present. It seems, more than anything, as if a certain number of them *must* be present, in order to show a positive reaction.

Thus we often find that in cases of grave tertiary skin phenomena, in which the spirochætæ pallida is only sparingly to be found, and with the described cases of neuro-relapse, which are certainly very serious, we nearly always obtain a negative Wassermann. In my opinion, the positive Wassermann should be regarded as one of the symptoms of syphilis (or, if you prefer the expression, one of the physical signs), which may or may not coexist with others, although we know that in the majority of cases it is positive when other manifestations are active.

On the other hand, syphilitics can have healthy children and grandchildren and reach a great age, with a positive Wassermann.

The negative reaction is only of value if it is constantly observed during several years, or, if in a case of primary sore, a positive Wassermann has never developed, in consequence of energetic preventive treatment.

As far as I have read the communications, and according to my own experience, I cannot acknowledge a superiority of "Salvarsan" over the mercurial therapy with regard to the Wassermann reaction. I nearly always get a negative Wassermann after an energetic cure in Aachen, without wishing to deny that a certain percentage of the cases become positive again, just as with "Salvarsan."

But, for that very reason, one always treats with the chronic intermittent treatment. I have whole series of patients who have remained negative for years after this method.

The most important question which attaches to the description of the clinical results is that of the duration of the accomplished cures. In the first reports relapses were not even mentioned. Conclusions of the farthest reaching character were drawn (the Sterilizatio Magna was proclaimed "*sans phrase*"), without time being taken to touch on this most important subject. This omission was so much more disastrous as the popular press spread these assumptions, and claimed the cure of syphilis through one single injection of "606" as an accomplished fact.

I regret that time does not allow me to give you a full account of the latest literature of the subject, but from my own experience, I can confirm the observations of Scholz in Königsberg, that one subcutaneous injection of 0.4—0.6 gramme, or even 0.7 gramme, in recent secondary syphilis, is hardly ever followed by complete disappearance of the disease; and that almost 50 per cent. of relapses occur in from 6 to 8 weeks after the injection. I wish to emphasize this statement, as I note from the English publications that certain authorities state that relapses hardly ever occur.

As was to be expected, reports of relapses soon began to accumulate. In order to show how different are the declarations of the authors, I will mention, out of the great number of observers, only such as are appropriate to show the extremes. Wechselmann noticed forty relapses among 1,250 cases; McDonagh only 2 in 85. Herxheimer saw also only 2 in 230, both with late lues.

In contrast with that, Rille, Mickley, Grouven, Linser, Friedländer, Joseph, Eiter, and Mulzer saw relapses occur within eighteen days to six weeks after injection for primary affections. Geronne had 22 among 71 syphilitic patients, Brocqu and Le Blaye 9 relapses among 21 cases; Bayet saw 7 relapses in 10 cases in two and a half months. Paulus saw only 10 per cent. of his patients injected for early lues remain free during six months. Gennerich was able to observe four relapses in lues maligna.

The relapses observed in cases of tertiary syphilis often occur earlier after "Salvarsan" than after mercury and even iodides.

Beside the relapses, so-called failures were observed—that is, cases in which the remedy either did not work at all, or worked incompletely. Klingmüller saw in the Kiel University Clinic 6 per cent. of failures among 273 cases of primary syphilis, 2 per cent. with secondary and 12 per cent. with tertiary; Zulzer had 2 failures besides 4 relapses among 12 cases; Joseph, the well-known author of the text-book which is also translated into English, found, together with Sibert, 6 among 65 cases; Grouven, 15 among 254 cases; and Bruhns 4 among 74 cases.

The relapses have a special importance in the eye and the nervous system. Whereas formerly the relapse of early syphilis of the eye, specific iritis, was at any rate a rare occurrence, now, nearly all authors who have greater experience report relapses of the eye and ear. Buschke, Wechselmann, and Cohen more frequently saw iritis; Kowalewski observed neuritis optica 2 months after injection. Fischer saw among 8 relapses no less than 5 grave cases of eye disease. Beck noticed 2 grave cases of disease of the vestibular and cochlear apparatus 7 to 9 weeks after injection. Rille, 3 cases of grave affection of the labyrinth, 4, 10½, and 12½ weeks after "Salvarsan."

In speaking of secondary actions I have already expressed my opinion as to whether these cases are to be regarded as relapses of the nervous system, or must be looked upon as arsenical poisoning. Lastly, I would like to quote the observations of Michaelis, who saw relapses also of the central nervous system, after about 3 months—that is, about the time when we are also accustomed to see relapses appear after "Salvarsan" in other cases. From these instances it clearly appears that a sterilizato magna by means of "Salvarsan" is not, as a rule, obtained.

"Salvarsan" has, according to universal experience, a chance only where it can come by the blood stream into direct contact with the spirochæte. But the spirochætæ are only to be found in the blood stream during a relatively short period, perhaps during the first three months, after which they become almost exclusively inhabitants of the glands and the connective tissue. Around the localization the organism responds with reactive products, by which a sort of capsule is formed. This prevents the "Salvarsan" from affecting the parasite. Thus does Ehrlich account for the failure of the remedy on the feebly vascularized cerebral nerves, and so also is the defective action on the glands accounted for. It is just the latter which should have puzzled the first enthusiastic observers, for we have always been accustomed to ascribe to the condition of the glands the greatest prognostic value and importance.

We saw also, that with indurated primary affections, the parasites which lie in the neoplasm are sheltered. On the other hand, the virus in primary affections for which arsenobenzol is given before the formation of an induration, really seems incidentally to have been entirely destroyed. But no certain conclusion upon the matter is yet possible, on account of the short time there has been for observation.

You see, Gentlemen, the dream of a quick and absolutely certain curative method which is harmless for the patient, is frustrated by the singular retention of the spirochæta pallida in the human organism.

Nevertheless, we must not, on this account, overlook the advantages which Ehrlich's discovery carries with it. Only, we must assign limits to the new remedy, and remind ourselves once more that it is just the same with every other remedy. "We have a new medicament, a particularly serviceable new medicament, in addition to the other recognized remedies." That was the opinion at the meeting of the South-West German Dermatologists on the 12th March, 1911. Nearly all the medical men who spoke in the discussion pointed out the *combination* of mercury and iodide with "Salvarsan" as the proper remedy, and what is most important for the present comprehension of this question is this: Ehrlich himself acknowledges that the absolute sterilizatio magna has not up to the present time been attained, and that "Salvarsan" must not be prescribed without the other syphilitic remedies.

I lay especial emphasis now on these facts, as at the time, even in this country, many medical circles accepted the erroneous dictum given to the lay world by the daily press, that enough had been achieved by one "Salvarsan" injection.

The practitioner should leave to the lock hospitals the decision of the question whether lasting results, without danger to the patient, are to be obtained through "Salvarsan" alone, perhaps by oftener repeated injections. To this end prostitutes, who can be observed for long periods, are specially good material. But for private practice, where patients are exacting of speedy and obvious results, it should be postulated that every patient must in the first instance be treated with mercury. The glandular swellings we combat with iodine (iodides), preparing them by that means for an optional injection of "Salvarsan."

Treatment by baths, sweating, and drinking, can at the same time be helpful, as we carry it out at Aachen, and the importance of which, for making the most of the antisyphilitic remedies, is well known.

Our procedure reads thus: mercury, preparations of iodine, *and* "Salvarsan," not mercury, preparations of iodine, *or* Salvarsan. The remedies, according to our present views, should not replace, but complement, one another where it is necessary.

I would like, after what has already been said, to lay down the following indications for treatment.—In any case an intravenous injection, combined with mercurial inunction, is to be recommended for fresh primary sores which are not yet become indurated, combined, if possible, with excision of the chancre. If induration has already supervened, or if secondary manifestations already exist, then I see no indication for treatment by "606" in ordinary cases, as then I would prefer to obtain a cure and a negative Wassermann equally well without "Salvarsan," but by inunction only—that is, by a much less differential remedy. If one is not successful in obtaining the negative Wassermann, or if the case inclines to relapses, then I would combine Hg. and iodide with an injection of 0.3 gramme of "Salvarsan," at the beginning and end of the inuncton cure.

This holds good alike for the secondary as well as the tertiary periods. The failure of the old specifics is a strict indication for treatment by arsenobenzol, but I lay stress on the fact that these are exceptions. As regards the eye, for specific iritis, which does not promptly yield to energetic treatment by inunctions or calomel injections, "Salvarsan" may be highly recommended. In optic neuritis and other affections of the fundus it may be tried, as ill-effects on the nerve need hardly be feared, provided that the drug be given by the intravenous method.

With malignant syphilis and in those very few cases where there exists an idiosyncrasy against mercury in every form, "Salvarsan" is indicated in all circumstances. It will then often enough be found that after the improvement of the general health, the tolerance of mercury again becomes greater. I should like here again to insist upon the point that the wonderful effect upon malignant lues does not in any way prove the superiority of "Salvarsan" over the other specifics. Arsenobenzol attacks the spirochæte much more, evidently from another side. Sarsaparilla is almost worthless for ordinary syphilis, whilst it often works wonders in malignant and grave cases. It is not so much a question of the quantitative as the qualitative difference of the curative effect.

In acute syphilis of the central nervous system, "Salvarsan" is to be avoided, as the reaction may prove fatal. In chronic cases it is advisable. In tabes, *one* injection may be tried in cases at a quite early stage. In those cases where commencing general paralysis is diagnosed, it ought to be recommended under all circumstances, having regard to the uncertainty of diagnosis as between general paralysis and syphilis, and especially when the first infection dates back no farther than ten years.

According to my judgment, in the consideration of methods, the intravenous need only be taken into account, as it does not create any difficulties worth mention, and is far more undifferentiated, and at the same time efficacious, than the subcutaneous and intramuscular injection.

The following may be regarded as all-important contra-indications: syphilitic aortic incompetence; uncompensated heart lesions; myocarditis; brachycardia; aneurism; long-standing tabes; tabetic optic atrophy; chronic nephritis; diabetes; and old age.

In all cases the patient must be informed that the method still has certain dangers; and that there is no "cure at a stroke," as has been proclaimed in the lay press.

The old regulations for sexual intercourse, and other precautionary rules, as well as those relating to the contracting of marriage, remain unaffected.

I cannot more fitly conclude than by reaffirming with emphasis my entire belief in the extreme importance of Ehrlich's discovery.

There can be no doubt that the profession is now in a much stronger position for fighting the malady, for it is in precisely those cases where formerly the medical man was constrained to stand, so to speak, with folded hands, that notably good results can now be obtained.

I regard "Salvarsan" as a remedy which, under proper indications, may assist the older methods, and, occasionally, with great success, replace them, a remedy for which we owe a great debt of gratitude to its distinguished inventor.

ON CASES OF NIGHT-BLINDNESS WITH PECULIAR CONJUNCTIVAL CHANGES IN CHILDREN.*

BY

SYDNEY STEPHENSON,

LONDON, ENGLAND.

AT a meeting of the Section held on May 26th last, I exhibited a little boy, aged five years, who was brought by his mother to the Queen's Hospital for Children because he could not see at night and had "white spots" on his eyes. Examination of the blood showed that hæmoglobin was 68 per cent., red cells were 3,900,000 and white cells, 8,000 per c.cm. The colour-index, then, was 0·87.

The interest excited by the foregoing case led me to believe that a brief description of this curious condition, which does not seem to be at all generally recognised outside the ranks of ophthalmic surgeons, might not be wholly devoid of interest to members of the Section. Yet it is not altogether uncommon in the neighbourhood of London, provided one knows where to look for it, and looks for it at the right season. It prevails in children belonging to the lower *strata* of society, as, for example, such as are to be found as inmates of poor-law schools, orphanages, and so forth. In order to give readers some idea of its prevalence in those places, I may say that I found it to be present in 1·87 per cent. of 6,209 presumably healthy children whose eyes I examined a few years ago.[1] On the other hand, in my experience it is not at all common in children's hospital work, mainly, I suppose, because the affected children seldom make any complaint of their eyes, and also because the hospital class, as a class, is notoriously unobservant. At the same time, a good many cases have been reported from the Sheffield Infirmary by Simeon Snell,[2] and a few from the London Hospital by Stephen Mayou[3] and by Malcolm L. Hepburn[4] respectively. Speaking for myself, I have seen occasional instances in the ophthalmic department of the Queen's and the Evelina Hospitals for Children. But I have yet to meet with a case among children of the better class, *i.e.*, such as might consult us in private practice.

It prevails in summer and autumn, and is seldom seen during the winter months.

The symptom-complex in its fully developed form, includes—first, changes in the ocular conjunctiva, and, secondly, night-blindness. This conjunction is sometimes spoken of as "Bitot's syndrome," despite the fact that it was described,[5] though perhaps not very fully, by de Hubbenet, a Russian army surgeon, in 1860—that is, three years before Bitot wrote.[6]

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* A communication read before the Section for the Study of Disease in Children of the Royal Society of Medicine on 27th October, 1911.

The conjunctival changes are seldom seen except in that part of the ocular conjunctiva which is exposed when the lids are open, the so-called "interpalpebral zone" (E. Fuchs). They usually affect both eyes (Fig. 1), sometimes to an unequal extent. They occur as more or less triangular areas (often situated one on each side of the cornea*), which are dry, and look as if they had been bespattered with tiny particles of white foam If the foam-like material be wiped away (a simple affair), it is reproduced within twenty-four or thirty-six hours after complete removal. The glistening, dry-looking *plaques*, if once seen, can scarcely be mistaken for anything else. To the condition the name "epithelial xerosis" (Saemisch) is commonly applied.

In my experience, and, indeed, in that of every other observer who has investigated the point, the patches on the conjunctiva are crowded with the saprophytic organism, the xerosis bacillus.

A history of the second symptom, night-blindness, is often difficult to elicit from young children. Neither have we at our disposal any ready or accurate objective means of ascertaining its presence or absence in that class. In residental institutions, however, nurses and attendants not infrequently present a child for medical consultation because they have noticed him to stumble about in twilight, or to knock into objects after the gas jets have been turned low in the dormitories.

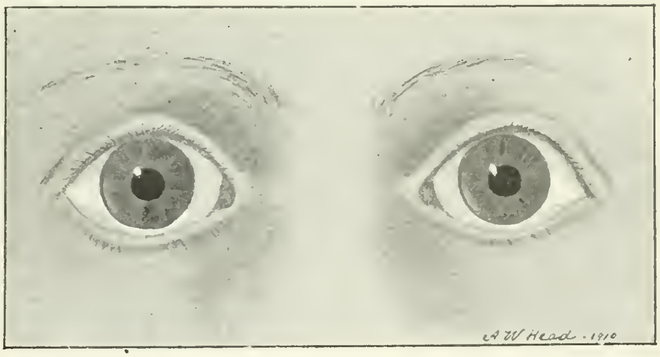

FIG. 1 †

The relationship between conjunctival changes, on the one hand, and night-blindness, on the other, is not invariable. The one symptom may occur without the other, and *vice versa*. Indeed, the proportion of those with conjunctival xerosis who suffer from night-blindness varies not only according to time and place, but also in the same place at different times. Thus, among 18 cases of xerosis seen by me in 1895 at one of the largest London poor-law schools, no fewer than 61 per cent. were more or less blind at night, whereas during 1896 and 1897, when 9 cases of xerosis were respectively found, definite night-blindness appeared to be altogether absent.

At the same time, xerosis and night-blindness occur so often side by side that, as several authors have remarked, the association between them is likely to be something more than merely coincidental. Indeed, I shall now endeavour to show that the connection is much closer than is generally supposed.

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*The changes are specially prone to affect the temporal side of the ocular conjunctiva, possibly because a larger area of the mucous membrane is exposed to the influence of light there than elsewhere,

†The white line encircling the lower third of each cornea is unusual in these cases, although not uncommon in cases of keratomalacia.

Fig. 2.

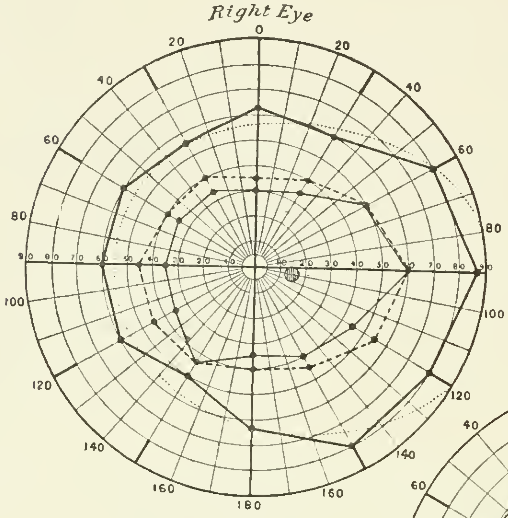


Fig. 3.

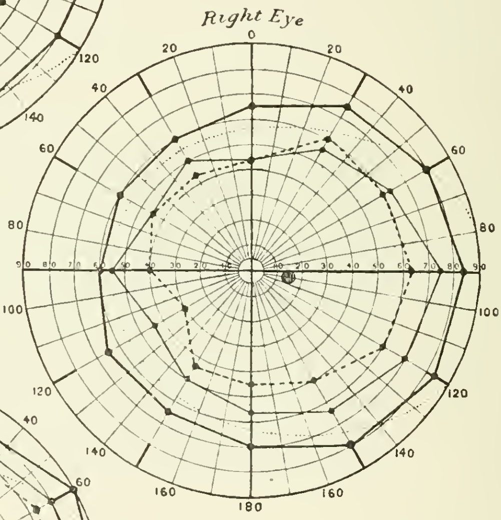
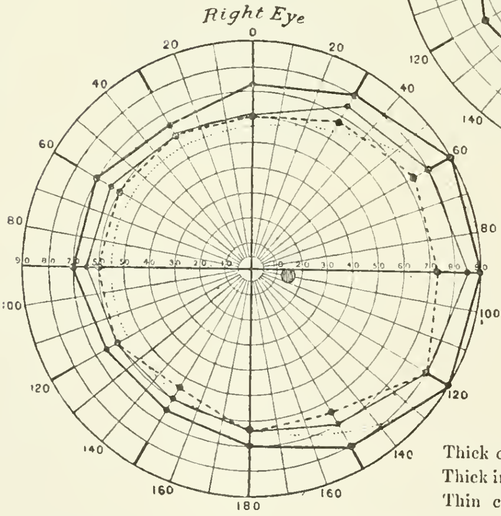


Fig. 4.



Thick continuous line = field for white ▬▬▬

Thick interrupted line – field for green - - - - - -

Thin continuous line = field for red ———

Changes in field of vision in a case of epithelial xerosis not accompanied by night-blindness. —L. M., aged 10 years. Fig. 2, field on August 16, 1897 : light minimum, 2 sq. mm. ; hæmoglobin, 70 per cent. ; red cells, 80 per cent. Fig. 3, field on October 30, 1897 : hæmoglobin, 80 per cent. ; red cells, 90 per cent. Fig. 4. field on recovery : hæmoglobin, 80 per cent. ; red cells, 116 per cent.

In the course of investigations undertaken some years ago[1], I found that in children with xerosis, but without ascertainable night-blindness, there existed changes in the visual fields. These were of two kinds, *viz.*, constant and inconstant. The former consisted in a reduction for the red and green fields. But that was not all, for the field for red was more shrunken than that for green, so that the former lay inside the latter, whereas under normal conditions, the reverse should, of course, be the case. In three-fourths of the patients examined with reference to this point the transposition was complete, but in the others the two fields overlapped at one or more places. The second or inconstant change lay in a slight contraction of the limits of the field for white (Figs. 2, 3, and 4). In contradistinction to this observation, Hepburn, in a recent communication[4] dealing with xerosis of the conjunctiva and night-blindness, states that in these cases "the fields of vision are invariably full," but Theodor Saemisch[7], on the other hand, mentions the occasional occurrence of the symptom.

Neither ring scotomata nor zonular defects were observed in any of my patients.

Now the changes in the visual fields, indicated rather than described above, may be found, as I have already said, in simple conjunctival xerosis as well as in xerosis associated with night-blindness, although they are more pronounced under the latter conditions (Figs. 5 and 6). Moreover, the so-called "light minimum," as estimated by Förster's photometer, was diminished in both the conditions named. The obvious conclusion is that in both there exists a state of torpor retinæ. In other words, every child with the conjunctival changes is in a condition of potential night-blindness, although obvious symptoms of that ailment cannot perhaps be discovered on casual examination.

Furthermore, during my investigations I found a third point of connection to exist between the two conditions in the shape of changes in the fundus oculi. Both in simple xerosis and in xerosis complicated with night-blindness the fundus presented slight departures from normal. Thus, the retinal reflexes were exaggerated, so that the fundus looked paler than usual ; while, in addition, a semi-circular, jagged reflex was often to be observed close to the inner side of the optic disc. These points, although under any circumstances somewhat intangible, were easier to appreciate when ophthalmoscopic examination was conducted under weak illumination with an undilated pupil.

Most of the affected children I have examined appeared, on a first view, to enjoy good general health. They were usually well-nourished, while not a few had bright and ruddy cheeks. Bitot[6] noted as a singular circumstance that in the epidemic described by him among the inmates of the *Hospice des Enfants Assistés de Bordeaux*, the ailment affected those in rude health, and spared for the most part the many scrofulous and rachitic inmates sheltered by the Asylum. A somewhat similar conclusion was reached by Cohn[8] in 1868, and was repeated only the other day by Malcolm L. Hepburn.[4]

A more attentive examination of my own cases convinced me that to not a few the old name "strumous" might fitly be applied. Such appearances as otorrhœa, large tonsils, opacities of the cornea, eruptions about face and ears, swollen upper lips, nasal catarrh, enlarged cervical glands, and synovitis of the larger joints were common among them.

Besides this, I found that the children with xerosis conjunctivæ, with or without night-blindness, showed a deficiency in the hæmoglobin content of the blood. For example, in 15 cases hæmoglobin averaged only 65 per cent. of the normal. When the conjunctival changes had disappeared, the proportion was found to have risen, but never to *par*. This observation led me to enquire as to the possibility of Gower's hæmoglobinometer (the instrument I employed) being over-standardised. On this point I was unable to obtain any satisfactory information, and so with the assistance of Mr. G. C. Burton, then resident medical officer at the Queen's Hospital, the point was investigated in 164 children, whose ages ranged from a few months

Fig. 5.

Right Eye.

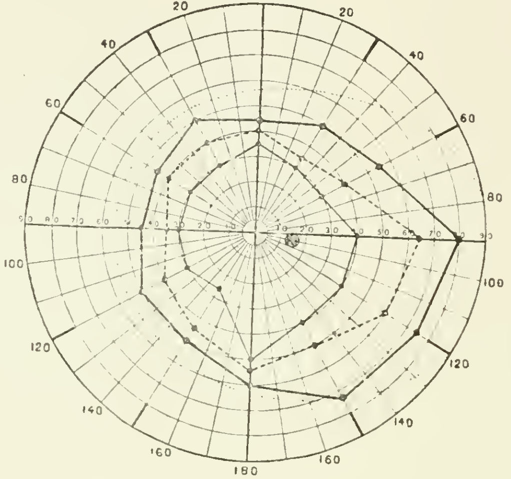
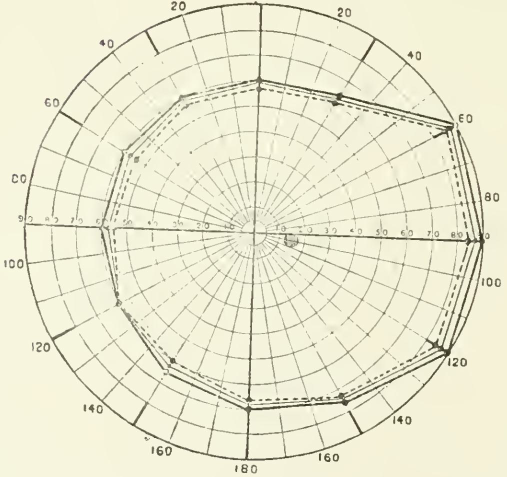


Fig. 6.

Right Eye



Thick continuous line = field for white ————

Thick interrupted line = field for green - - - - - -

Thin continuous line = field for red ————

Changes in field of vision in a case of epithelial xerosis accompanied by night-blindness.—H. H., aged 10 years. Fig. 5, taken on August 9, 1897, shows that the fields for white, red, and green are contracted, and that the red and green fields are transposed. Light minimum, 10 sq. mm.; hæmoglobin, 70 per cent.; red blood cells, 98 per cent. Fig. 6 shows the visual field after recovery. Hæmoglobin, 85 per cent.

to fourteen years, In every instance the percentage of hæmoglobin fell below 100. It averaged 76.62 per cent.; was slightly greater in males than females; and bore no definite relation to age. The exact figures have been embodied in an appendix to the present communication. One fact stood out clearly, namely, that the percentage of hæmoglobin was lower in children with than without xerosis conjunctivæ. Among the former the average was 65 per cent., while among the latter it stood at 76.62 per cent.

The red blood count ranged from 70 per cent. to 134 per cent., and averaged 80 per cent.

From all this it follows, then, that in xerosis, with or without night-blindness, the relationship between red cells and hæmoglobin—the so-called "colour index"—is generally reduced. To put the matter in another way, a condition akin to chlorosis, *as determined by the blood*, exists in the cases we are discussing.

Can we bring the several facts enumerated into line as accounting for the cause of this curious affection? I believe that we can. In the first place, it is significant that xerosis and night-blindness should occur only in poor-class children, and should make their appearance exclusively in spring and summer and autumn. Again, as regards any given institution, it is a matter of familiar observation to those acquainted with the circumstances that the brighter the weather the greater is the number of cases. The dazzling of sunlight, indeed, appears to be the immediate cause, and this is doubtless intensified by the ingrained habit of institutional children, who persist in running about the airing courts of the poor-law school, which are generally paved with York flags, without any protection whatever to the head in the shape of caps or hats. Anybody who has ever visited one of those places during summer weather will bear me out when I say that the flagged yards reflect an uncomfortable body of light into the eyes, apart altogether from the direct rays of the sun falling from above. The reflection from the white-washed walls, so common in those institutions, also, is doubtless not without influence. That boys suffer more than girls, a point brought out by Bitot,[6] is probably due to the relatively greater freedom enjoyed by the first-named class. For my own part, at all events, I do not believe in a true sex incidence of the disease.

The white patches are to be found only on that part of the conjunctiva which is exposed to light when the eyes are open. This suggests that under the influence of light, or of some of its elements, the metabolism of the exposed parts undergoes an alteration, and thus allows the xerosis bacillus, an almost constant inhabitant of the conjunctival sac, to lodge upon the parts and to multiply to an enormous extent. Particles of keratin and of keratohyalin are found pathologically in the altered epithelium, and this leads, as Stephen Mayou[3] has pointed out, to an alteration in the surface tension of the affected areas, in consequence of which the oily secretion of the Meibomian glands collects upon them in the form of a white foam. But it is important to remember that the bacilli themselves play no part in the causation of the symptom-complex, although the contrary view has, of course, been held by more than one writer, myself[1] among the number.

Last, but not least, the remote cause, in my opinion, is to be sought in some slight defect of nutrition, as indicated by an alteration in the colour-index of the blood.

Finally, it should be said that recurrence is common in one and the same subject. Yet although this may happen during several successive summers, the ailment does not appear to entail any serious or permanent mischief, either as regards the eye itself or the body generally.

APPENDIX.

Estimation of Hæmoglobin in 164 *Healthy Children.*

(Tested by means of Gower's Hæmoglobinometer.)

Age.	Males.	Females
1 year	83·5	75·0
2 years	73·3	—
3 ,,	70·0	73·0
4 ,,	73·3	75·0
5 ,,	73·8	76·3
6 ,,	74·0	76·4
7 ,,	74·0	73·7
8 ,,	79·0	75·0
9 ,,	77·7	75·2
10 ,,	78·3	82·4
11 ,,	76·3	72·0
12 ,,	91·0	80·4
13 ,,	81·8	78·4
14 ,,	77·0	73·0

Number of children examined 164 { Males, 88.
(ages 2 months to 14 years) { Females, 76.
Average hæmoglobin = 76·62 per cent., *i.e.* males 77·35 per cent.,
and females 75·83 per cent.

REFERENCES.

1. **Stephenson, Sydney.**—*Trans. Ophthal. Society U.K.*, Vol. XVIII, 1898.
2. **Snell, Simeon.**—*Ibidem*, Vol. I, 1881, p. 207.
3. **Mayou, Stephen.**—*Ibidem*, Vol. XXIV, 1904.
4. **Hepburn, Malcolm L.**—*Ibidem*, Vol. XXX. 1910.
5. **de Hubbenet.**—*Annales d'Oculistique*, T. XLIX, p. 293.
6. **Bitot.**—*Gazette Hebdomadaire*, 1 mai, 1863.
7. **Saemisch.**—*Handbuch der Gesamten Augenheilkunde*, Bd. I, S. 443, 1905.
8. **Cohn.**—*Ueber Xerosis Conjunctivæ*, Breslau, 1868.

CLINICAL MEMORANDUM.

TRANSILLUMINATION AS AN AID IN TREPHINING FOR GLAUCOMA.

By Alfred C. Norman, M.D. (Edin.)

HOUSE SURGEON TO THE SUNDERLAND AND DURHAM COUNTY EYE INFIRMARY.

Since I saw Major Elliot demonstrate his operation at the last Oxford Ophthalmological Congress, I have had an opportunity of trephining for glaucoma in seven cases—two acute and five chronic—and the result has been in every instance all that Elliot claims for the operation.

My object in sending this note is to suggest a simple procedure which I hope may prove to be as great a help to other beginners as it has been to myself.

While practising transillumination in the dark room, I was greatly struck by the clearness with which the anterior scleral ring of a normal eye could be defined. (By the anterior scleral ring I mean that zone of scleral tissue which lies between the periphery of the cornea and the attachment of the iris.) When a strong beam of light, from a mirror at close quarters, is thrown into the lower half of the pupil, this ring stands out as a brightly illuminated band round the upper segment of the cornea, in marked contrast to the dark area of the ciliary region behind. By using a Würdemann's transilluminator, and pressing it against the skin of the lower lid, the scleral ring can be illuminated in its whole circumference at once.

My next step was to transilluminate some eyes rendered blind by long standing chronic glaucoma, and I found in every case that the illuminated area of scleral ring was more or less markedly diminished in breadth. It then occurred to me that transillumination of the eye might prove of value during a trephine operation for glaucoma, but I did not attempt to carry it out in the operating theatre until I had obtained some eyes from freshly killed animals and had satisfied myself, by dissection, that the brightly illuminated zone around the cornea was actually in front of the attachment of the iris.

The first case on which the transilluminator was used during an operation was one of chronic glaucoma in which the eye was blind, painful, and as hard as a stone, so that I suspected considerable adhesion of the iris at the filtration angle. The conjunctiva was separated at the limbus with some difficulty, and the flap was reflected on to the cornea. The theatre was darkened and a Würdemann's transilluminator was pressed against the lower lid (with a speculum still *in situ*). The illuminated band of scleral tissue was at once seen to be very narrow, so I split the cornea a little further forward before applying the trephine, with the result that the instrument entered the anterior chamber without cutting that part of the iris which was adherent at the filtration angle. Tension has remained slightly subnormal in this eye, and there has been no further pain.

The next case was a straightforward one of acute glaucoma. The conjunctiva was easily dissected up to the limbus, and the cornea was split, as Elliot advises. The transilluminator was applied as before, but in this instance the scleral ring was beautifully illuminated in its whole breadth and showed that I had ample room in which to apply the trephine, so as to reach the anterior chamber directly. This eye has so far done well, the visual acuity being restored to $\frac{6}{5}$. T.n.

In the very first case of glaucoma that I trephined there was marked adhesion of the iris at the filtration angle, as a consequence of which the trephine went through the iris, and a curette could be passed through the scleral wound, *behind the iris*, into the anterior chamber. On transilluminating this eye, some time after the operation, it was seen that the scleral band was very narrow. Had the transilluminator been used at the time of the operation, the trephine might have been applied somewhat further forward, although the conjunctiva was very much matted down in the limbal region, and dissection was difficult. The tension of this eye has been reduced by the operation, but it is still a little above normal.

In conclusion, I venture to suggest that transillumination in the dark room would be of some value in determining how much the iris is adherent at the filtration angle in all cases to be trephined for glaucoma, and that it would prove a help to beginners in their early cases if it were practised during the actual stages of the operation.

I am deeply indebted to Dr. H. Boyd Cunningham, honorary surgeon to the Sunderland and Durham County Eye Infirmary, for his courtesy in allowing me to perform the operations on his cases, and for his permission to publish these notes.*

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*Mr. Sydney Stephenson has kindly pointed out to me that Würdemann has already done some work in showing up the filtration-angle with his transilluminator. This, I believe, was done before the days of trephining for glaucoma, and I am sorry to own that I was ignorant of it when the above note was submitted to the Editor of THE OPHTHALMOSCOPE. It will be interesting to see if anyone has forestalled me in using the transilluminator, during the operation, as a guide to the correct point for applying the trephine.—A. C. N.

NOVELTIES.

A MODIFIED INSTRUMENT FOR THE PERFORMANCE OF THE OPERATION OF SIMPLE TREPHINING FOR THE RELIEF OF GLAUCOMA.

BY

R. H. ELLIOT, M.D. Lond., F.R.C.S.

MAJOR I.M.S.

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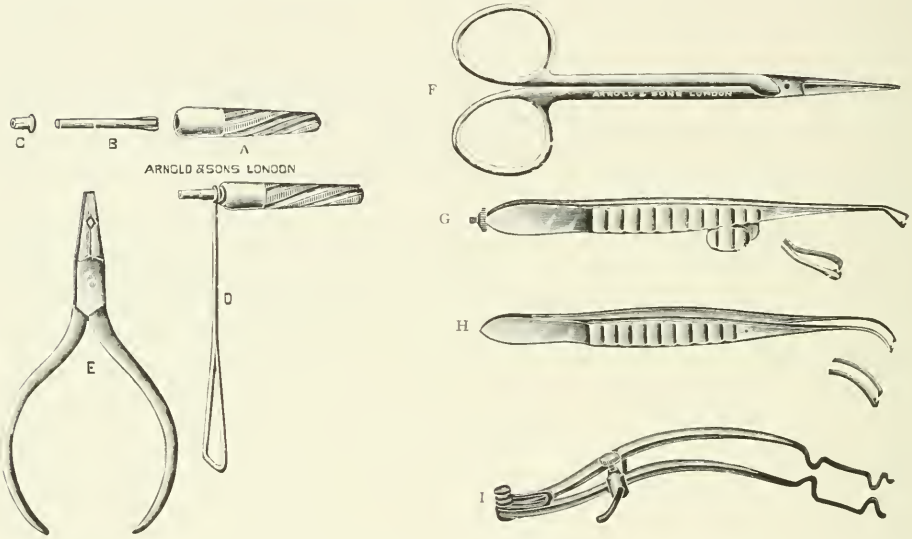

AN experience of over 400 trephinings has shown that the instruments for the purpose now on the market are all imperfect. The best we have seen is that invented by Mr. Sydney Stephenson, and the guiding lines for the present model have been taken from his model. The new features presented are as follows :—

(1) **The Shape of the Handle** (Fig. A).—In order to give the surgeon a good grip and to prevent his fingers from constantly slipping down as he presses, (a) the handle is made conical with the apex of the blunt cone upwards, (b) the fluting is spiral in arrangement, and (c) the edges of the fluting are serrated at right angles to its length.

(2) **The Nature of the Blades** (Fig. B).—These are made so that they can be used and thrown away as soon as they become blunt. The blades are made from solid drawn steel tubing ; one end of each blade is divided into three parts, and opened to form a spring—this when inserted into the handle, holds the trephine firmly—the other end forms the cutting blade, and the edge is brought up sharp from the inside. This enables the operator to cut a hole the exact size of the trephine.

(3) **The Method of fitting the Blades.**—A small pair of pincers (Fig. E) is supplied, with which the blade can be easily fitted into or removed from the handle. This should always be done at the time of operating. The blades must never be left in after use. The handle is hollowed throughout, so that it can be

easily and quickly cleaned and dried after use by means of a pipe cleaner (the best form being the "Metropolitan" pipe cleaner made in the United States of America and sold by all tobacconists).

The bore of the proximal portion of the hollow is slightly less than that of distal portion. This, whilst enabling the handle to be cleaned, at the same time prevents the blades from passing up more than the correct distance.

(4) **A stop** (Fig. C) can be supplied which can be fitted to any of the blades.

(5) **A small handle is provided** (Fig. D) with a loop at the end, through which the blades can be passed. This enables an operator to keep the cutting edge of his blade in one position during the operation, and is an improvement on the method of holding the blade with forceps.

The other instruments employed in the operation are shown in figures F, G, H, and I.

The whole instrument is supplied in a small case by Messrs. Arnold & Sons, of Giltspur Street, E.C., to whom I am much indebted for the assistance they have given me in working out the details of the instrument.

REVIEW.

THE FIELD OF VISION.

(*Continued*)

BY

J. JAMESON EVANS, M.D., F.R.C.S.,

BIRMINGHAM, ENGLAND.

VISUAL FIELDS IN DISEASES AND INJURIES OF THE ORBIT AND NASAL SINUSES.

Diseases of the Orbit.

GROWTHS of the orbital tissues may be associated with changes in the character of the visual fields, owing to involvement of the optic nerve by pressure, infiltration, or damaged nutrition through obstruction of its vascular supply. Obstruction of the retinal vessels may result in thrombosis of the central retinal vein or some of its branches or embolism of the central artery with corresponding modifications of the field of vision. Many anomalous cases have been published—*e.g.*, Ring[1] has reported a case of fibroma of the orbit, in which there was papillœdema, followed by atrophy of the disc and slight contraction of the field for white and marked contraction for colours. The fellow eye was healthy, but there was slightly more contraction of the field for white and there was some interlacing of the colour fields. Wood[2] has described a case of pulsating exophthalmos with central scotoma and contracted field. In a case of cancer invading the orbit from the posterior ethmoidal cells, Birch-Hirschfeld[3] found that the primary impairment of vision was a central scotoma. This symptom he regarded as of toxic origin rather than as a pressure effect, since the peripheral field was full. Full vision and field were noted by the reviewer in a case of extradural tumour of the optic nerve with evident compression of the nerve by the growth (Fig. 1). In a case of sarcoma surrounding the optic nerve, observed by Onodi[4], the nerve was found histologically normal.

Diseases of the Nasal Sinuses.

The possibility of disturbances of vision in connection with disease of the accessory nasal sinuses is now well recognised,[5,6] and Onodi's investigations[4] have enabled us to offer a feasible explanation of the symptoms in many cases. It cannot be said that any alteration of the visual field can be considered pathognomonic of sinus disease, but recent investigations go to show that these alterations are valuable aids in the diagnosis of diseases of the accessory sinuses. van der Hoeve[7] draws attention to enlargement of the blind spot, or, as he calls it, a "peripapillary scotoma," as an early symptom in the diagnosis of optic-nerve affections due to disease of the posterior nasal accessory sinuses. In one of his cases this symptom was associated with empyema of the antrum of Highmore, but in the other cases the disease was confined to the posterior ethmoidal and sphenoidal cells. In one case the symptom was contralateral, a condition which is easily explained by Onodi's anatomical investigations. The enlargement of the blind spot for colours was usually of such a character that red and green showed the largest scotomata, blue smaller, and white the smallest. Occasionally, however, the order was reversed with regard to red and blue. Green was difficult to work with, and his main deductions are drawn from the scotomata for red, blue, and white. van der Hoeve regards this peripapillary scotoma as the earliest ocular symptom of disease of the posterior accessory sinuses, and finds that it may exist for a long time as the only defect in the visual field. He insists that the sign can be considered positive only when (1) the scotoma for colours is decidedly larger than that for white, or (2) the extent for white and colours is decidedly greater than normal, or (3) the size of the scotoma changes in the course of the disease. In reference to (1), the author seems to have overlooked the fact that this is a physiological condition. The absolute size of the scotoma is not diagnostic, as the size of the blind spot is not a fixed quantity—at any rate, it may be found that what appears to be a normal blind spot is actually a little enlarged. Enlargement of the blind spot is also found in abnormalities which enlarge the optic disc or cause atrophy of the surrounding tissues; it is also frequently found in retrobulbar neuritis, and may be the first symptom of toxic amblyopia. In this connection, van der Hoeve is of opinion that enlargement of the blind spot is an early symptom of toxic affections of the optic nerve due to resorption of intraocular inflammatory products, and thus is explained the cases of enlargement of the blind spot in sympathetic irritation reported by Ramsay and Sutherland[8]. Holth[9] found central scotoma in three cases of sympathetic

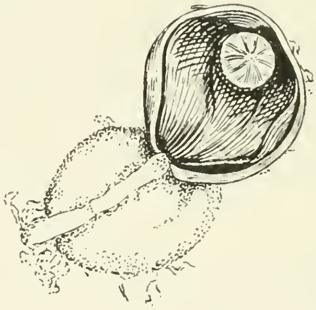

Fig. 1.

iridocyclitis after trauma. This scotoma, which was present in the exciting as well as in the sympathizing eye, disappeared after the cure of the inflammation, and van der Hoeve is of opinion that it was due to a retrobulbar neuritis and it would have been found that it was preceded or accompanied by peripapillary scotoma, if such had been looked for. Congestion of the optic disc is not an adequate explanation of the enlargement of the blind spot in these and other cases, as such congestion was not observed in several cases. In some cases of sympathetic inflammation Holth was unable to find any central scotoma, and van der Hoeve could not discover scotomata in cyclitis, due to other causes.

Peripapillary scotomata are first indicated by enlargement of the blind spot for colours. At a later stage an absolute peripapillary scotoma for white develops, and the scotoma for colours becomes larger and may involve the point of fixation or become merged with a simultaneously developing central scotoma, so that a pear-shaped or dumbbell-shaped, or the typical oval, scotoma results. In extreme cases an absolute scotoma for white, involving the blind spot and the point of fixation, results. When the scotoma for one colour reaches a point on the periphery of the field for this colour, the limits of the scotoma cannot be determined on this side.

Occasionally, a colour sense may disappear altogether. de Kleijn[10] similarly found the blind spot enlarged—sometimes for colours only, sometimes for colours and white—in cases of disease of the posterior accessory nasal sinuses. In three cases this symptom was absent, although there was distinct disease of the sphenoidal and posterior ethmoidal cells. He further made the important observations that decided improvement followed regular *lavage* of the nose, but that slight enlargement of the blind spot remained until surgical measures were adopted, when it returned to its normal size. *Plugging* of the orifices of the accessory sinuses caused an enlargement of the blind spot in cases where the mucous lining of these cavities was diseased, but gave rise to no alteration when the mucous membrane was healthy, and from this fact he assumes that in addition to congestion, intoxication plays a *rôle* in disease of the peripapillary bundle. In some cases the plugging was followed by reduction in the size of the blind spot, presumably owing to improved circulatory conditions.

de Kleijn found the peripheral field and vision normal in his cases of axial neuritis with enlarged blind spot, and only small abnormalities, such as tortuous vein and slight hyperæmia of the papilla, were observed ophthalmoscopically. He refers, however, to grosser complications of sinus disease, such as papillœdema, detachment of the retina, thrombosis of central veins, where, of course, both the peripheral field and the vision would be markedly affected.

de Schweinitz[11] also refers to the presence of scotomata, with or without limitation of the peripheral field, in sinus disease. He cites one case in which there was a delicate ring scotoma surrounding the fixation point in the left eye, and a triangular paracentral scotoma in the right. By extension—chiefly temporal-wards—these became large oval central scotomata, which gradually improved under repeated irrigation of the sphenoidal sinus. Russ Wood and Wallis[12] also noted ring scotoma in sphenoidal sinusitis.

Although peripapillary or central scotomata, without contraction of the peripheral field, would appear to be usual in the early stages of sinus disease, it is generally found, when patients consult an ophthalmologist, that there are grosser changes in the optic nerve and changes in the peripheral field associated with central scotomata. The reviewer[13] has reported several cases of this kind, including a one-sided temporal hemianopia and a bitemporal hemianopia. Glegg and Hay[14] have also reported a bitemporal hemianopia from ethmoidal disease, and Krauss[15] a case of ethmo-sphenoidal disease in which there was general concentric contraction of the field in one eye and a loss of the supero-nasal half of the field in the other eye with only occasional evidence of central scotoma. Although Birch-Hirschfeld has emphasized the importance of a central scotoma as characteristic of a tumour in the neighbourhood of the posterior accessory sinuses, Berger[16] and Bull[17] found peripheral contraction on the temporal side, with intact central vision, in cases of tumour of the sphenoidal sinus. At a later stage of Berger's case, the progressive contraction of the field involved the macula. Kooy and Kleijn[18] draw attention to the retention of functionally active insular areas in cases of partial or complete loss of retinal function following sinus disease, but the presence or absence of such areas has no clinical significance, as far as one can judge at present.

Orbital and Nasal Injuries.

Blows on the orbital margins have been recognised as a cause of amaurosis from Hippocratic times, but as a cause of partial loss of the visual field, they have not received the same acknowledgment. The reviewer[19] has drawn attention to ipsolateral temporal hemianopia in cases of blows or falls, not necessarily of a severe type, on the external angular process (fig. 2). He also observed[20] that blows on the upper border of the orbital margin were often associated with loss of the superior part of the field (fig. 3). In many cases the peripheral restriction of the field is associated with relative or absolute central scotoma for white or colours or both, as in the case reported by Pichler.[22] In the majority of these cases there is unilateral atrophy of the optic nerve, whereas the nerve in the fellow eye is healthy, although there is frequently a slight peripheral contraction on the field on that side as well.

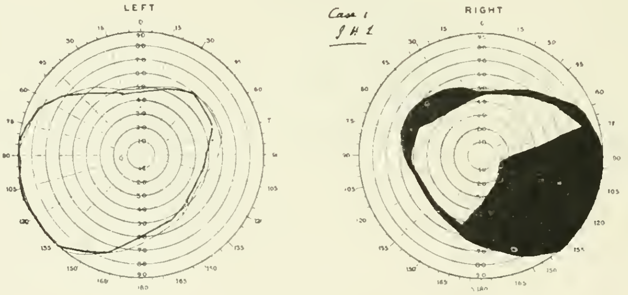

Fig. 2.

Blows on the eye itself by blunt objects, such as garden stakes, umbrella points, etc., are sometimes followed by partial or complete atrophy of the optic nerve. Cases of this sort, in which some fibres of the optic nerve were ruptured at the lamina cribrosa, have been reported by Lang[23] and the reviewer,[21] and in both instances the visual field corresponding to the ruptured lower fibres was lost, *viz.*, in the upper half. In Hepburn's[25] case the lower and inner field was defective. Lawson[24] has reported a case of thrombosis of the inferior temporal artery with absolute scotoma involving the greater part of the upper and outer field as the result of a blow on the eye. Loss of the upper half of one field (contralateral), associated with pallor of the optic disc, were observed by Laas[26] after resection of the nasal septum. In another case recorded by this observer, complete loss of vision in the left eye and temporal hemianopia of the right eye followed removal of an exostosis on the left side of the septum nasi by means of a motor saw. Watson Williams[6] refers to a case of permanent blindness following *curettement* of the ethmoidal cells for nasal polypus. Onodi also refers to Freudenthal's[27] case of contralateral optic atrophy and loss of vision as the result of operating by Killian's method on the right frontal sinus.

Posey[28] has reported a case of unilateral optic neuritis with full field for form but contracted for colours, the result of a blow on the face and fracture of the malar bone and orbital plate.

Gunshot Injuries involving the Orbit and Neighbouring Parts.

Gunshot injuries, whether involving the orbit or not, are often associated with intraocular lesions, and these lesions, *e.g.*, retinitis proliferans, choroido-retinitis, retinal and choroidal hæmorrhages and ruptures, determine, in the main, the character of the visual field after these injuries.

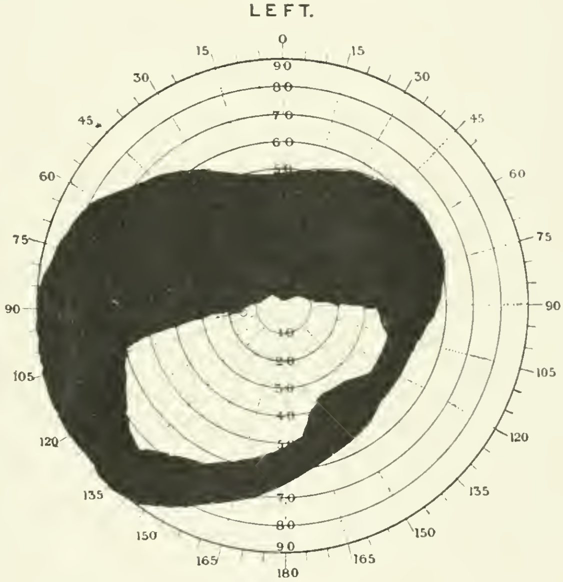

Fig. 3.

More obscure in their pathogenesis and more variable in their effects on the visual fields are gunshot injuries which are not associated with intraocular lesions, but which are followed by partial or complete atrophy of the optic nerve. In a case of this sort reported by Nettleship,[29] there was decided pallor of the disc and reduction of vision ($\frac{6}{18}$), with slight general contraction of the field. The reviewer[21] has reported a case in which a patient, who shot himself in the mouth, showed partial atrophy of the optic nerve, loss of the lower half of the visual field, and a contraction of 30° in the upper half. When the orbit was opened, the bullet was found below, close to, but not touching, the optic nerve. Birkauser[30] saw complete loss of vision in one eye, with white œdema and hæmorrhages at the posterior pole of the eye, as the result of perforating wound of the palate by a pipe stem.

DISEASES AND INJURIES OF THE CHIASMA.

Bitemporal restriction of the fields is generally regarded as a symptom highly suggestive of a chiasmal lesion. In a series of cases of pituitary growths collected by Uhthoff,[31] temporal hemianopia, unilaterial or bilateral, was found in 30 per cent. of those without acromegaly, and in 43 per cent. of those with acromegaly. Homonymous hemianopia was noted in 1·8 per cent. of the former, and in 4·3 per cent. of the latter.

It has been pointed out by Doyne[32] and others that the colour fields may show a characteristic temporal contraction, which is not apparent in the field for white, when taken on an ordinary perimeter. Possibly, the field for white, taken on a Bjerrum's screen, would show a similar contraction. In a chiasmal case recorded by Rönne,[33] the left eye showed, by the ordinary perimeter, a definite temporal hemianopia, with the division line passing through the point of fixation, whilst there was a full field in the right eye. With Bjerrum's test (6/2000), the greater part of right temporal field was seen to be lost, and there was also a comet-shaped scotoma extending from the blind spot towards the point of fixation. In another case, not so definitely proved to be a pituitary growth, he found that both fields were lost with the exception of the upper nasal quadrant in each eye. The horizontal meridians of these nasal fields were so defined that Rönne regards it as a definite proof that the uncrossed fibres are divided into two separate and distinct groups at the chiasma.

A *relative* bitemporal hemianopia with apparently full fields was also noted by Lafon[36] in a case of acromegaly.

Perimetric charts of cases of pituitary growths shown by Fisher[34] and Richardson Cross[35] indicate that the progress of the contraction of the fields is often (invariably, according to Cross) from above downwards, and Fisher's fields also show that in some cases small islands of vision may be retained in the blind areas for some considerable time after the loss of the greater part of the temporal field. Similar areas were noted by de Lapersonne and Cantonnet[37]. Cross has never found absolute blindness in either eye in these cases, there being some area of vision remaining in all his cases. Fisher and Cross figure numerous charts showing typical and atypical fields of vision in pituitary growths. From these it can be seen that when the area of blindness approaches the vertical line between the temporal and nasal fields, it is liable to involve the point of fixation and seldom shows the macular deviation and overshot character seen in cortical lesions. With the spread of the growth, the temporal fibres become involved, with consequent irregular contraction of the nasal field. Extension backwards and involvement of the tract fibres would produce homonymous hemianopia. Galezowski[38] has reported cases of meningitis involving the chiasma. The fields showed temporal hemianopia except in one case in which there was irregular nasal hemianopia. Lewitsky[39] found bitemporal hemianopia in a case of caries of the sphenoidal sinus, probably of tuberculous origin. Wood[40] has recorded a case of probable tumour of the pituitary body in which the hemianopia was binasal. Binasal hemianopia has been ascribed to a double lesion affecting the non-decussating fibres at the lateral angle of the chiasma, as in atheroma of the internal carotids (Weeks[41]) or degeneration of the arteries of the corpus callosum (Knapp), but Shoemaker[42] is inclined to believe that nasal hemianopia is generally associated with demonstrable optic neuritis and in most instances is a symptom of optic nerve disease. The limitation of the field at the median line is never very exact in these cases.

LESIONS OF OPTIC TRACTS AND CORTEX.

Lenz[43] is of opinion that in hemianopia of the tract, primary centres, or anterior portions of the optic radiations, the macula is generally involved, but in lesions behind the internal capsule the macula escapes. Best[44] also finds that in tract hemianopia the border line runs through the point of fixation, and that this line is not quite vertical but corresponds with the physiological line of separation of the two halves of the retina. Behr[45], however, states that the fixation point, as a rule, escapes in tract hemianopia. Wilbrand[46] believes that it is impossible to conclude that there is a tract hemianopia from the form of the hemianopic field of vision alone. The mode of onset and rate of failure of vision, the presence or absence of signs of the lesion extending to or from the chiasma to the opposite tract cerebral nerves, crura cerebri, or basal ganglia, the pupil reactions, and Weber's syndrome may give valuable indications as to the seat of the lesion. In pure and complete tract lesions we should expect complete homonymous hemianopia in which the colour limits in the retained halves coincided exactly with the line of separation and were normal in extent.

In the incomplete forms, the colour fields do not retain such a close relationship to the form field, and colour-blind zones or quadrants have been recorded. van Duyse[47] has placed on record a case of tract lesion from a gunshot wound of the temporal region. The field defect involved practically the whole of the left upper quadrant of each field, but extended entirely round the fixation point into the right lower quadrants, like a bird's beak, whilst the small retained central areas looked like bird's eyes on the charts. Judging by the position of the bullet by radiography, the lesion was supposed to lie in the anterior portion of the optic radiations.

Kipp[48] believes that the hemiopic form of scintillating scotoma has its seat in the primary optic path, especially in the optic tract or region of the external geniculate body. Pick[49] states that hemianopic, as well as other forms of hallucinations may be *provoked* in any part of the visual apparatus from the cornea to the occipital cortex. The homonymous hemianopia due to disease of the primary optic centres, likewise, can only be diagnosed by the associated signs, such as hemiplegia, hemianæsthesia, hemiplegic chorea, athetosis, etc. That these associated symptoms may be altogether absent in extensive lesions in the immediate neighbourhood, is shown by the case reported by Wharton,[50] in which there was irregular left homonymous hemianopia with general contraction of the fields, especially on the right side, and optic neuritis, but no general nervous symptoms, as the result of a glioma occupying the anterior two-thirds of the two lower temporal convolutions, and involving the lower portions of the internal capsule and the lower border of the lenticular nucleus. Wilbrand has collected eight cases, in which there was hemianopic defect of the central portion of the field of vision—vertical or horizontal macular hemianopia, or sector-like defects within the 10° to 60° circles which extended to the point of fixation. Central vision, colour perception, and the periphery of the visual field and fundi were normal. The scotomatous areas were generally absolute and remained stationary for years. These cases are regarded by Wilbrand[51] as disproving Monakow's theories of the representation of the macula in the visual cortex. Posey[52] has recorded a case of right homonymous macular hemianopia, in which there was confusion of mind and speech, as well as the difficulty in reading noted by Wilbrand.

Cortical Lesions.

The typical field, due to a lesion of the visual cortex, is homonymous hemianopia with over-shot boundary line and preservation of the maculæ. Hemiachromatopsia without restriction of the field for white, or reduction of acuteness of vision has been described, but in many of these cases it is quite possible that if a sufficiently small test object were used, as in Bjerrum's method, a relative scotoma for white would have been found in the colour-blind area, as in the case recorded by Poulard[53]. Unless it can be shown that cases of colour hemianopia exist without any evidence of diminution in the form sense as tested by Bjerrum's and Groenouw's methods, we cannot definitely assert that there is a separate and distinct centre for colour perception. Nothing conclusive has been decided as to the sub-division of retinal representation in the cortex. A case of Henschen's[54] seemed to show that the upper part of the retina is represented in the upper lip of the calcarine fissure, and the lower part in the inferior lip, and that a horizontal strip between the upper and lower parts of the retina is represented at the posterior extremity of the fissure. That the entire half vision centre it not situated in the depth of the calcarine fissure is shown by the case described by Beevor and Collier,[55] in which the calcarine fissure, the inferior portion of the cuneus dorsal to it, and the lingual lobule on its ventral side, were all destroyed, yet quadrantic hemianopia alone, the fixation point escaping, was the only defect in the visual field. Mills'[56] views on this question are thus summarised: (1) a lower quadrant of the field, or a little less than a quadrant, is represented in the upper half, or two-thirds of the cuneus; (2) the upper quadrant, or a little less than a quadrant, is represented in the lower half of cuneus, including the middle portion of the calcarine fissure; (3) the macula, or at least the fovea, is represented in the anterior extremity of the calcarine fissure and its cuneal border; (4) a zone or strip of the peripheral retina is represented in the posterior extremity of the calcarine fissure and its cuneal border. Cases of quadrant anopsia, such as those recorded by Swanzy and Werner,[57] Doyne,[58] and Groenouw[59], do not help to the more exact localisation of visual centres.

"Quadrant anopsia suggests a cortical origin, although not necessarily, as it is altogether probable that dorsal ventral and medial portions of the retinal half-field are represented by separate bundles in the optic radiations as they are by subdivision of the cuneus and calcarine fissure" (Mills).

Double hemianopia may be due to double lesions of the optic nerves, tracts, basal ganglia, optic radiations, or cortex. In all cases of double hemianopia of cortical origin, such as that described by Dejerine and Vialet, the lesions involved the mesoventral surface of the occipital lobes and the calcarine fissure was implicated. Double hemianopia is generally the result of successive attacks of homonymous hemianopia and may result in complete blindness or in the retention of a small central area round the fixation point, giving rise to a form of tube vision. The retention of this area of central vision can only be explained by the existence of a separate macular centre in the lower cortical visual zone (Mills[56]).

Cases of single and double hemiachromatopsia and quadrantic achromatopsia of cortical origin have been described by Swanzy,[61] Mackay, and Dunlop[62], and others, and from these records it has been ascertained that the convolutions of the temporo-occipital region are most probably concerned with colour recognition.

INJURIES OF THE SKULL AND ITS CONTENTS.

These injuries may be followed by various effects on the field of vision. In thirty cases of gunshot wounds of the cortical visual centre, Inouye[63] met with hemianopia, dextra, sinistra, inferior, and quadrata; scotomata, concentric contractions, and other non-homogeneous defects. Such injuries, however, cannot be regarded as confined to the cortical centres, as it is well known that the effect of bullet wounds on the contents of the skull is far reaching and complex.

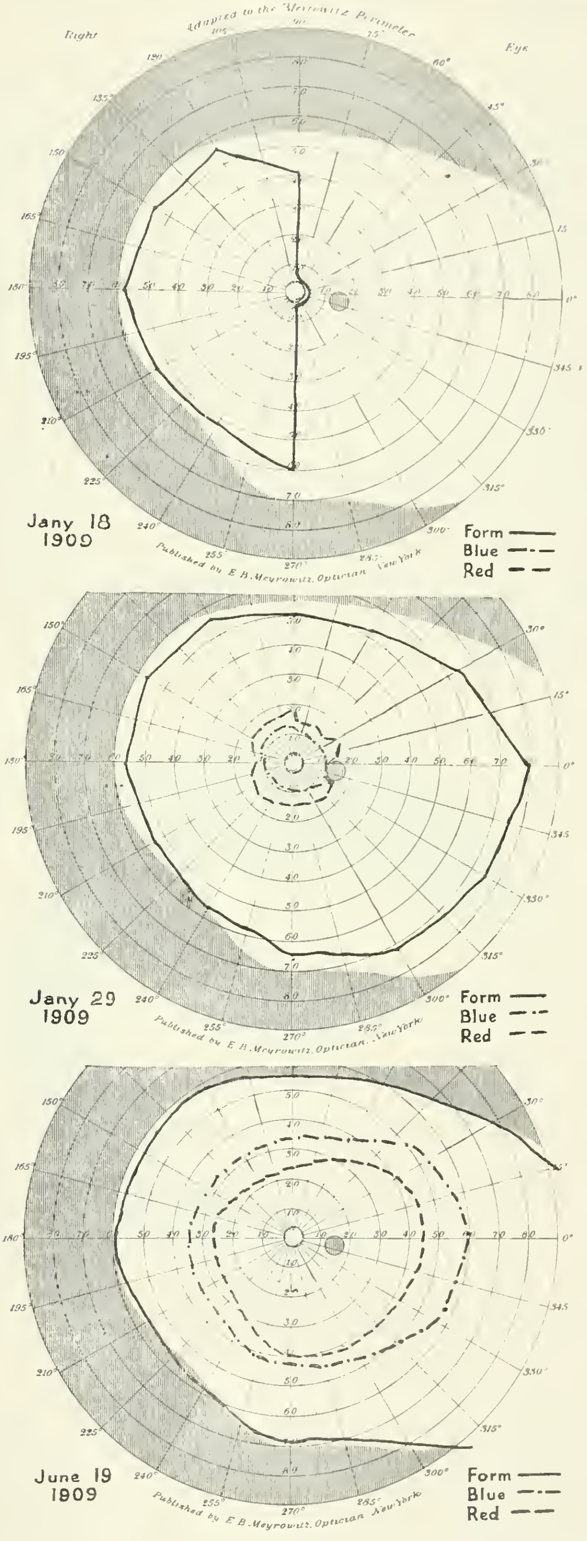

FIG. 4.—To illustrate the changes in the colour fields subsequent to sub-temporal decompression. Chart 1. Immediately before operation. Hemianopsia and complete achromatopsia. Chart 2. Nine days after operation. Form field practically normal, colour inversion. Chart 3. Complete restoration of fields for form and colours. A supposed case of tuberculoma of left occipital lobe. Headache, vomiting, choked disc $1\frac{1}{2}$ D.

Coutela and Velter[64] reported a case of gunshot wound of the right occipital region, 2 cm. from the middle line and a little below the occipital protuberance, in which there was a sharply defined left homonymous hemianopia, without motor or sensory disturbance. The hemianopia was limited by a vertical line, which passed through the point of fixation. There was also, at first, some contraction of the right halves of the fields. Four months after the accident, some amount of light perception returned in the blind halves.

James[65] has recorded a case in which right homonymous, hemianopia followed a fractured base, the result of a fall on the right external angular process of the frontal bone. In this case the division line distinctly avoided the maculæ. There was slight peripheral contraction of the seeing halves of the fields. There were no associated symptoms which would help to localise the position of the lesion, but the author fixed it in some part of the optical fibres, behind the corpora quadrigemina, and most likely in the occipital lobe itself.

Gamble[66] has reported a case of right homonymous hemianopia, with marked dyslexia, resulting from a bullet wound in the left temporal region.

Critchett[67] has described a case of bullet injury of the occipital lobes (entrance of bullet 1½ in. below right parietal eminence, exit 2 in. above occipital protruberance on left side), in which the lower half of each field was lost. The boundary line was irregular, and the maculæ were not affected. He also refers to a similar case of injury of the right occipital region, associated with left homonymous hemianopia, recorded by Page.

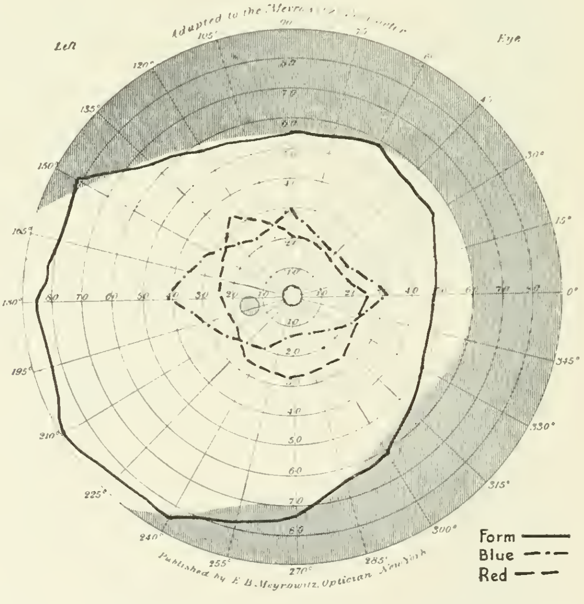

FIG. 5.—To illustrate colour interlacing. A case of cerebello-pontine tumour. Choked disc 1½ D.

Fisher[68] also described a case of right homonymous hemianopia with difficulty of articulation, and two of altitudinal hemianopia—the lower half of the fields being deficient in each case—the result of bullet wounds of the occipital region. In one of the latter cases one eye showed a spiral exhaustion field, which was regarded as functional. In each case the macular area was spared, and good central vision was retained.

FIELDS OF VISION IN TUMOURS OF THE BRAIN.

Bordley and Cushing[69] have made important observations on the fields in cerebral tumours. They find that alterations, long regarded as peculiar to hysteria, occur frequently as a symptom of brain tumour. Out of 56 cases examined they found interlacing of the colour fields in 25 ; inversion of the boundaries in 9 ; hemiachromatopsia in 4 ; scotoma for blue in 3 ; blue blindness 3 ; green blindness 1 ; complete colour blindness 5 ; normal colour fields 6 ; alterations of the form fields was only noted in 18 cases. After operation for the relief of intracranial tension, 41 out of 42 showed normal boundaries of the colour fields (Fig. 4). In general, the field for blue showed the greatest departure from the normal. As the dyschromatopsia seems to be dependent on increased intracranial tension, it is possible that it may characterise organic lesions other than tumours.

These observations have since been confirmed by several observers, and Bordley[70] has recently again reviewed the subject. He states that "though colour reversal and interlacing undoubtedly do occur in hysteria they are, as a symptom of brain tumour, quite constant."

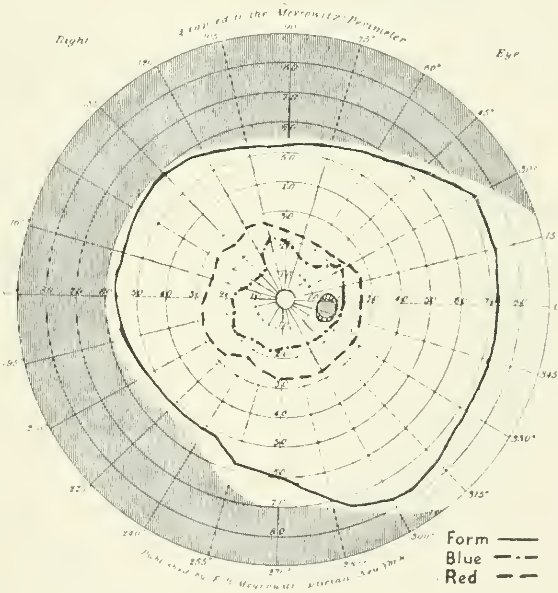

FIG. 6.—To illustrate colour inversion. Case of glioma of left frontal lobe. Choked disc 6 D.

"The predominant features in most of the charts is the alteration in the lines which represent blue. While the fields both for form and colours are in some instances concentrically contracted, almost invariably the greatest loss is in the blue fields. At times this results in interlacing of the lines for red and blue (Fig. 5) ; at others the blue is found inside the red (Fig. 6) ; and still less frequently it is entirely lost. The usual manner in which the change in the blue field was brought about was by the formation and fusing of peripheral scotomata. Changes in the field for colours other than blue were occasionally seen, but their inconstancy, we believe, makes them of little diagnostic value. It is interesting to note that disturbance in colour-vision often foretold the changes which were later to take place in the field for form. As an illustration, hemiachromatopsia in several instances preceded complete homonymous hemianopsia (Fig. 7). The colour disturbances do not seem to be dependent upon the presence of neuro-retinal œdema, because in several of our patients

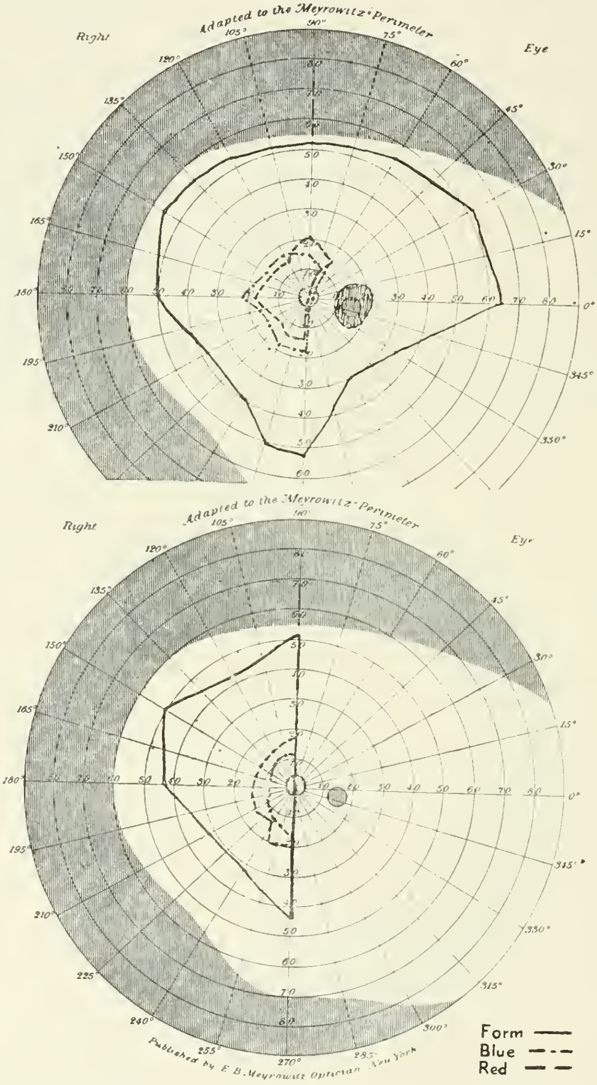

FIG. 7.—To illustrate the progress of hemianopsia. Chart 1. Colour interlacing in one-half of the field, achromatopsia in the opposite. Chart 2. Fourteen days later. In place of colour interlacing there is colour inversion. Complete hemianopsia has succeeded hemiachromatopsia. A case of glioma of left parietal region. Choked disc 4 D.

they antedated ophthalmoscopic changes. Following decompressive operations these changes disappeared, and we concluded that their presence must in some way have been dependent upon increased intracranial tension" (Fig. 4, Charts 1, 2, 3).

(*To be concluded.*)

REFERENCES.

1. **Ring, O.**—*Ophthalmic Record*, 1910, p. 130.
2. **Wood, D. J.**—*Trans. Ophth. Soc. U.K.*, Vol. XXI, 1901, p. 135.
3. **Birch-Hirschfeld, A.**—von Graefe's *Arch. f. Ophth.*, Mai, 1907.
4. **Onodi, A.**—*The Optic Nerve and the Accessory Sinuses of the Nose*, 1910. Translated by Lückhoff. Baillière, Tindall, and Cox, London.
5. THE OPHTHALMOSCOPE, April, 1908.
6. **Williams, Watson.**—*Rhinology* (Longmans, Green, & Co., 1910). Gives a good *résumé* and bibliography of the subject.
7. **Hoeve, van der.**—*Arch. of Ophthalmology*, January, 1911.
8. **Ramsay and Sutherland.**—*Ophthalmic Review*, January, 1906.
9. **Holth.**—Quoted by van der Hoeve.[7]
10. **De Kleijn, A.**—von Graefe's *Arch. f. Ophthalm.*, Bd. LXXV, Heft iii, 1910.
11. **de Schweinitz.**—*Trans. Amer. Ophth. Society*, 1910.
12. **Wood, Russ and Wallis.**—*Lancet*, September 24th, 1910.
13. **Evans, J. Jameson.**—THE OPHTHALMOSCOPE, April, 1908.
14. **Glegg and Hay.**—*Arch. f. Laryngologie*, Januar, 1910.
15. **Krauss, F.**—*Ophthalmic Record*, January, 1910.
16. **Berger.**—Quoted by Onodi,[4] p. 99.
17. **Ball.**—*Ibidem*, p. 99.
18. **Kooy and Kleijn.**—von Graefe's *Arch. f. Ophth.*, Bd. LXXVII, Heft iii.
19. **Evans, J. Jameson.**—*Brit. Med. Journal*, July 8th, 1905.
20. **Evans, J. Jameson.**—THE OPHTHALMOSCOPE, April, 1908.
21. **Evans, J. Jameson.**—THE OPHTHALMOSCOPE, February, 1910.
22. **Pichler, A.**—*Klin. Monatsbl. f. Augenheilk.*, August, 1911.
23. **Lang, W.**—*Trans. Ophth. Society U.K.*, Vol. XXI, 1901, p. 98.
24. **Lawson, A.**—*Trans. Ophth. Society U.K.*, Vol. XXX, p. 234.
25. **Hepburn, M.**—*Roy. Lond. Oph. Hosp. Rep.*, January, 1910.
26. **Laas.**—*Zeitschr. f. Augenheilkunde*, August, 1907.
27. **Freudenthal.**—*Arch. Int. Chauv. et St. Hilaire*, Paris, 1905.
28. **Posey.**—*Ophthalmic Record*, May, 1911.
29. **Nettleship, E.**—*Trans. Ophth. Society U.K.*, Vol. XXI, 1901, p. 108.
30. **Birkhauser, R.**—*Klin. Monatsbl. f. Augenheilk.*, Juli, 1911.
31. **Uhthoff, W.**—*Trans Int. XVI Cong. of Medicine*, Budapest, 1909.
32. **Doyne, R. W.**—*Trans. Ophth. Society U.K.*, Vol. XV, p. 133, and Vol. XXXI, p. 95.
33. **Rönne, H.**—*Klin. Monatsbl. f. Augenheilkunde*, Oktober, 1910.
34. **Fisher, J. H.**—*Trans. Ophth. Society U.K.*, Vol. XXXI, Fasc. 2, 1911.
35. **Cross, Richardson.**—*Trans. Ophth. Society U.K.*, Vol. XXXI, Fasc. 2, 1911.
36. **Lafon.**—*Recueil d'Ophtalmologie*, mars, 1911.
37. **de Lapersonne and Cantonnet.**—*Arch. d'Ophtalmologie*, février, 1910.
38. **Galezowski, J.**—*Recueil d'Ophtalmologie*, juin, 1906.
39. **Lewitsky.**—*Klin. Monatsbl. f. Augenheilk.*, Januar, 1908.
40. **Wood, C. A.**—*Ophthalmic Record*, March, 1908,
41. **Weeks, J. E.**—*A Treatise on Diseases of the Eye*, 1911. Henry Kimpton, London.
42. **Shoemaker, W. T.**—*New York Med Journal*, February, 1905.
43. **Lenz, G.**—von Graefe's *Arch. f. Ophthalmologie*, Bd. LXXII, 1909.
44. **Best, F.**—von Graefe's *Arch. f. Ophthalmologie*, Bd. LXX, 1909.
45. **Behr, C.**—von Graefe's *Arch. f. Ophthalmologie* Bd. LXX, 1909.
46. **Wilbrand, H.**—Norris and Oliver's *System of Diseases of the Eye*, Vol. II, p. 293.
47. **van Duyse.**—*Arch. d'Ophtalmologie*, janvier, 1905.
48. **Kipp.**—*Journ. Amer. Med. Association*, April 22nd, 1905.
49. **Pick, A.**—*Journ. Amer. Med. Association*, January, 1904.
50. **Wharton, J.**—*Ophthalmic Review*, April, 1905.
51. **Wilbrand, H.**—*Klin. Monatsbl f. Augenheilk.*, Juli, 1907.
52. **Posey, W. C.**—*Ophthalmic Record*, May, 1908.
53. **Poulard, A.**—*Arch. d'Ophtalmologie*, janvier, 1905.
54. **Henschen.**—*Klin. u. anat. Beitr. z. Path. des Gehirns*, Upsala, 1890-1903.
55. **Beevor and Collier.**—*Brain*, 1904, Part ii, p. 153.
56. **Mills, C. K.**—In Posey and Spiller's *The Eye and Nervous System*, 1906.
57. **Swanzy and Werner.**—*Ophthalmic Review*, 1890.
58. **Doyne, R. W.**—*Lancet*, 1889.

59. **Groenouw.**—*Archiv f. Psychiat u. Nervenkrank.*, Bd. XXIII, Heft ii.
60. **Dejerine and Vialet.**—*Centralbl. f. prak. Augenheilk.*, Februar, 1894.
61. **Swanzy, H. R.**—*Trans. Ophth. Soc. U.K.*, Vol. III.
62. **Mackay and Dunlop.**—*Scottish Med. and Surg. Journ.*, December, 1899.
63. **Inouye, T.**—*The Visual Disturbances from Shot Wounds of the Cortical Visual Centre, from observations of the wounded in the last Japanese War.* W. Engelmann, Leipzig, 1909.
64. **Coutela and Velter.**—*Archiv. d'Ophtalmologie.* mars, 1910.
65. **James, R. R.**—*Ophthalmic Review*, November, 1910.
66. **Gamble, W. E.**—*Journ. Amer. Med. Assoc.*, January 23rd, 1904.
67. **Critchett, Sir A.**—*Trans. Ophth. Soc. U.K.* Vol. XXI, p. 123.
68. **Fisher, J. H.**—*Trans. Ophth. Soc. U.K.*, Vol. XXI, p. 127.
69. **Bordley, J., and Cushing, H.**—*Archiv. of Ophthalmol.*, September, 1909.
70. **Bordley, J.**—THE OPHTHALMOSCOPE, January, 1911.

NOTES FROM SOME CONTINENTAL EYE CLINIQUES.

(First Article)

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Prefatory.

WHEN the writer decided to spend several months in visiting some of the European *cliniques* it occurred to him—and simultaneously to the Editor of THE OPHTHALMOSCOPE—that some notes upon equipment, *technique*, and therapeutical methods might prove of interest to the readers of the journal.

It is not very easy to know what to say and what to leave out in such a series of notes, for it is obvious that what is of real interest to one reader may prove but stale news to another, who, perhaps, is more in touch with the *cliniques* referred to. I shall endeavour, of course, to avoid wasting space over banalities, but it is impossible to mention only what is new, since new and old are for the most part combined, and since a description which should leave out facts because they are not new would prove but poor reading.

There is another point to which reference may be made, namely, that I shall not offer, as a rule, opinions or criticisms. Obviously, such criticism is easy. No man is always equal to himself. Neither man nor method is perfect and permanent, yet in many instances it might be impertinent to criticise and to compare.

I.—FREIBURG.

Freiburg im Breisgau.—It is little wonder that Freiburg should draw students from all parts. The situation is well-nigh perfect, while the town of about 80,000 inhabitants and the district of which it is the chief centre are large enough to supply just that moderate amount of material which is so conducive to scientific clinical study.

The town—which seems to be a model of municipal management—is entirely on the flat, yet the nearer slopes of the Black Forest rise actually from the boundaries of its suburbs, yielding delightful exercise at a moment's notice, so to speak, while with a whole day to spend one can penetrate to some of the most picturesque parts of this most picturesque district of Germany.

The Augenklinik and its Equipment.

The buildings are partly new and partly old. The two portions are connected by a long covered passage which serves also as a patients' waiting-room. In the older part are the laboratory, the Professor's rooms, the library, and the operating room, all on the street floor; while on the floors above are wards. In the new part are the consulting room with its adnexa—dark room and perimeter room—and the lecture hall. Above, there are wards. The hospital contains about 65 beds. Below the street level, but open to the garden at the back, are the animal houses, in which I noticed mice, rabbits, guinea-pigs, and monkeys; the private laboratory, in which work two private assistants who carry out a large amount of the necessary technical details of research; the bath room in which, in addition to ordinary baths, a fine electric light bath is installed; a photographic dark room; the room for the preparation of culture media; and the kitchen department.

Approximately 5,000 new patients attend annually. The official staff consists of the Professor and four assistants; other assistants are unofficial. It is thus evident that the proportion of clinical workers to patients attending is more generous than in our country. Yet this is not all, for in the laboratory, completely fitted up for the carrying through of research work, may be found men who are devoting their time to special research, and who can at once undertake the biological or histological investigation of material from the *clinique*. In the out-patient department there is a lady clerk, who is also a typist. Lastly, there is "Hermann," the ubiquitous laboratory attendant. He is a host in himself in two senses of the word, for on his conjunctiva he carefully nurses the Morax-Axenfeld diplobacillus.

The Out-Patient Consulting Room is an oblong spacious apartment, with north-east lighting of generous amount. It contains the usual seats for surgeon and patient; a certain number of seats for patients waiting, and accommodation for refraction work. A word may be said about the position of the surgeon and patient when the latter first comes in for examination. The surgeon sits immediately at the window and with his back to it. On his his right, within easy reach of his hand and low down, so that he reaches down, not up, for what he wants, is a table containing all necessary dressings, instruments, and solutions, and a soiled dressings dish. The patient directly faces the north light of the window. Behind the surgeon is a Bruning's lamp on a bracket. This lamp can be swung into any desired position for the illumination of the patient's face. There is perhaps nothing very striking in any one of these details, but the combination struck me as giving the maximum amount of convenience and facility in practice.

The usual requirements for making smears and cultures are ready to hand, and there is a small room, just outside the consulting room, in which staining of smears and examination of urine can be carried out without going to the laboratory.

Perimetric, scotometric, and tonometric work are carried out in a separate room opening off the consulting room. All tensions, it may be said, are controlled by the Schiötz tonometer. The Priestley Smith scotometer is the one employed.

The dark room opens, on the one hand, off the consulting room, and, on the other, off the lecture hall. In the dark room a considerable amount of space is occupied by the projection apparatus. Opposite to the latter a square has been cut out of the wall between the dark room and the lecture hall. This square has a perfectly flat screen stretched over it on to which the picture or microscopic object can be projected without any extraneous light reaching the audience in the lecture hall.

The arrangement of the bays in the dark room is different, I think, from that of most British Eye Hospitals. This is probably due to the fact that the indirect method of examination is very largely employed. Each bay has a table projecting from the wall in such a way that a patient may sit at either side or in front of it. On this table is placed a pedestal lamp adjustable for height and movable about the table. The arrangement of the table and lamp is doubtless quite handy for indirect ophthalmoscopic examination and for focal illumination, but for the direct method the table is somewhat in the way. I understand from Professor Axenfeld that, in connection with a further extension of the buildings, the dark room will shortly be improved. The corneal microscope, the ophthalmometer, and the Hess skiascope are also in the dark room. The ophthalmometer is fitted with red and green mires (the design of Pfister and Streit, Berne), illuminated from behind. A trial of the instrument proved at once that the definition of the corneal images is particularly good.

The Lecture Hall certainly calls for notice. It is a lofty, well-lighted apartment of approximately 40 ft. by 25 ft. Along one side are large windows facing southwards. On the other side are the main entrance, the screen for projection already mentioned, and the entrance and exit to and from the dark room. Then comes a large built-out window with a bench for microscopes. This window is northwards facing. The windows are provided with opaque screens which are raised and lowered—all the screens at once—by an electric motor. Thus the room can be made perfectly dark at any time. For artificial light the ceiling reflection of four arc lamps is employed, no direct light coming from the arcs. This scheme of illumination is similar to that at Berne. The latter *clinique* claims priority. The available wall space is covered with diagrams, plates of the fundus, test types, Maddox tangent scale, and so forth. Round the room are placed stereoscopes, Hoppe's apparatus for investigation of binocular vision, ground-glass fronted boxes for the exhibition of radiograms, a perimeter, apparatus for the measurement of strabismus, and numerous ophthalmoscopic lamps. The floor is occupied by benches and seats arranged on three sides of a square, of which the fourth side is formed by the lecturer's table.

Operative Technique.

The Operating Room.—The operating room is in the older part of the building and is doubtless not so large as could be wished. It is well lit from one side, with a smaller window at one end. The operating table is placed parallel with the main windows, but for nearly all purposes the operator employs either a forehead lamp or a hand lamp held by an assistant. Each of these lamps is run off a "pantostat" which can be moved on castors to any desired position.

It would serve no purpose to describe the contents of the operating room in full, but a few points may be noted.

General anæsthesia is obtained by means of an apparatus administering any required amount of chloroform per minute along with oxygen from a cylinder.

The large *Innenpol* magnet of Mellinger, on an enormous movable pedestal, and the Volkmann magnet suspended on crutches from a swing bracket, each has a place. A useful fitment is a hot-plate on which saline solution, grafts, etc., can be kept at the correct temperature.

The drums containing sterilised dressings, etc., have their lids operated by a foot-pedal so that the hands are not employed at all to open them.

The operating table is of the pedestal type, raising and lowering by simple foot pressure on a pedal, and is movable round its axis and also along the floor.

Sterilisation, Prophylaxis, Preparation for Operation.—It is hardly necessary to say more, under the heading *Sterilization*, than that the details conform to modern practice. The surgeon and assistants wear face masks and clogs. Professor Axenfeld and his chief assistant, Dr. von Szily, wear a particular form of hood-like mask which covers the whole head and face except the eyes and upper part of the nose. No person is allowed into the operating room unless clad in a sterilized overall.

The Freiburg eye *clinique*, as everyone knows, is one in which a great deal of interest is taken in bacteriological work, and in which an exceptionally large amount of research work is done. It is therefore well worth knowing what *prophylactic* measures are adopted here in order to render operations upon the eyeball as safe as possible.

First, as to the investigation of the bacteriological flora. The *technique* employed is that of Elschnig, which is specially concerned with the detection of the pneumococcus In Freiburg it has been found (by Imre) that the pneumococcus is present in no less than 38 per cent. of normal eyes. This is a smaller finding than that of Gasparini (80 per cent.), but larger than what has hitherto been held to be the average in Freiburg, namely, 10 per cent. In addition, therefore, to the ordinary smear from the conjunctiva, the latter is investigated by Elschnig's method with a special view to the pneumococcus. I may, perhaps, be permitted to describe the method fully:

Elschnig's medium, which forms a specially favourable soil for the growth of the pneumococcus, can be prepared, I am told, in any laboratory. It is obtainable, ready prepared, from Altmann, Luisenstrasse, Berlin. It is composed of 1 part of horse serum to 3 parts of bouillon without peptone. 1 cc. of this medium is contained in a culture tube. With a sterile pipette fitted with a rubber teat, a few drops of the medium are drawn up and flooded into the conjunctival sac, the edge of the lower lid being held slightly away from the eyeball. While alternate pressure and relaxation are made over the sac region, the end of the pipette is rubbed lightly over the conjunctiva of the tarsus and plica. The fluid is sucked back into the pipette, and then mixed with the remainder of the medium in the test tube. The process may be repeated a second time; *i.e.*, the conjunctival sac twice flooded with the medium. It is particularly necessary to flush out the conjunctival sac with salt solution afterwards, since otherwise the pneumococcus might readily grow on the trace of medium left therein. The tube is incubated for 24 hours, and examined for organisms by Gram-stained smear and hanging drop methods. By means of the hanging drop, chain formation of pneumococci is easily detected. The usual rubbing on a glass slide tends to destroy chain formation.

Secondly, after the Elschnig medium has been applied, the lower punctum is dilated, and the patency of the nasal duct proved by injection of saline. In practice, of course, the flushing of the conjunctiva is combined with the flushing and testing of the lacrymo-nasal passages.

If the result is positive *quâ* the pneumococcus, the conjunctiva is treated with pyocyanase thrice daily, or with perhydrol 0.25 per cent. (washed out with normal saline) for four or five days before the operation. Further, on the night before operation the patient is given an injection of Römer's anti-pneumococcic serum and Kolle's anti-pneumococcic serum.

Thirdly, although I have not made any special enquiry about it, it is quite clear that an effort is made to introduce as little fluid as possible into the conjunctival sac during the operation. One may call this the "dry" method. It has been written about in THE OPHTHALMOSCOPE ere this, but practical details are of interest.

In ordinary cases not much toiletting of the conjunctival sac is done when the patient comes on the table. Cocain, adrenalin, etc., are mainly instilled in an ante-room, and, if I mistake not, Axenfeld has a preference for 10 per cent. cocain very sparingly applied when the patient is on the table. A douche with weak perhydrol (0·25 per cent.), followed by saline, is given when the patient is on the table, but, as a rule, the upper lid is not disturbed. Then, with dry sterile swabs, held in forceps, all superfluous fluid is mopped up, and the edges of each lid are *gently* rubbed with a similar dry swab. The instruments are transferred in their racks from the sterilizer to a large porcelain tray, which is lined with a sterile towel. They are lifted out of the rack by the assistant and laid directly upon the towel. They are never placed again in any fluid during the operation unless they require to be re-sterilized. When the operation is finished, the lid edges are again lightly touched with dry swabs and the eye is tied with a dry dressing.

Individual Operations.

enfeld's

It would prove tedious were I to go into detail of many operations, but there are certain operations in ophthalmic surgery the precise details of which always are of interest. Among these are certainly the cataract operation, all operations for glaucoma simplex, and strabismus operations. Enucleation of the eyeball under local anæsthesia (Siegrist's method) is, in my experience, so unusual that I shall say something about it, and also about Axenfeld's method of transplanting fat into Tenon's capsule. "Plastics," in which Axenfeld takes much interest, are too difficult to describe.

aract

In operating for *senile cataract*, perhaps rather I ought to say in cataract operations where the lens is removed entire, Axenfeld prefers to have a semi-dilated pupil. To obtain this, he employs scopolamine two days before, or homatropine an hour before the operation. In this, and in most other operations, the patient's face and head are covered with a large gauze "handkerchief," if one may so describe it, with a large hole cut out for the eye, brow, and cheek of the operation side.

The section is a large one, and a conjunctival flap is always made. The capsule is dealt with by means of capsule forceps (Kuhnt's), the blades of which have a double curve, such that an accidental grip of the iris is improbable, and a piece of capsule is removed. The lens in all the cases I have seen came away very easily. The iris is then replaced and immediately, or after a short wait, a "basal" or "peripheral" iridectomy is performed, unless indeed there is a bad prolapse of iris, or the case is an awkward one which calls for complete iridectomy. If the basal iridectomy has been performed, the iris is once more stroked into place. A second repositor is employed, in accordance with the rule that no instrument shall be reintroduced into the globe unless it has been resterilized.

This peripheral iridectomy, made with fine forceps and spring scissors, is usually very small, and in the cases I have seen has been quite successful. So far as I have observed, there is a minimum of handling of the eye to get rid of cortical fragments; the operator usually resting content with the lens as it comes away *en masse*. The large size of the section, of course, facilitates the delivery of the complete lens. In the delivery of the lens pressure and counter-pressure are made by means of two curettes. The Axenfeld speculum (right and left pattern, the upper blade being of plate form, the lower blade of wire form) is used in all bulbar operations and squints.

In cataract and glaucoma operations both eyes are covered, and over the dressing is placed a coarse-meshed wire mask, shaped for the nose and tied behind the head. Later on, when it is not necessary to bandage, but important to protect the eye, this mask is worn alone, the patient having ample vision for getting about owing to the coarseness of the mesh.

Operations for Glaucoma Simplex.—At the present time Axenfeld is operating on these cases by Lagrange's method. He deprecates the policy of leaving them to treatment with myotics, and is satisfied with the results of irido-sclerectomy. At the moment I am unable to say whether the *technique* is or is not exactly that of Lagrange. The eyeball is first inspected closely, and a situation chosen which shall, if possible, avoid the division of episcleral veins. The sclerotomy is performed with a narrow Graefe knife. The fixation forceps are placed just beyond the position of counter-puncture and enough below that point to be out of the way of the knife. The conjunctival flap is cut out with the knife as in cataract operations. The conjunctival flap is as much as possible manipulated with a cotton swab, or at any rate with nothing coarser than fine iris forceps. It is dissected off the anterior lip with fine snips of the spring scissors. A peripheral iridectomy if the iris has not prolapsed, and a complete iridectomy if it has done so, is the next step. Then, the sclerectomy is performed with strongly-made curved scissors, the conjunctival flap is replaced, and the dressing and mask are applied.

In desperate cases of glaucoma, where other operative measures have failed, Axenfeld sometimes, as a last chance, employs cyclodialysis. The *technique* in the only case I saw was as follows.—A considerable flap of conjunctiva was dissected up on the temporal side. At about 5 mm. from the limbus an opening in the sclera was made with a straight keratome. This opening was made with the most scrupulous care, and as small as possible—so small that it would only just admit the bent iris repositor or spatula. The spatula was made to hug the sclera, and the anterior chamber was successfully tapped. I think a conjunctival stitch was employed.

Strabismus Operations.—The advancement operation employed is a very simple and neat one. Double advancement at one sitting, without tenotomy, is sometimes done. Tenotomy alone is not *taboo* with Axenfeld, as with some operators. I shall endeavour to give an accurate account of the advancement.—Our English straight probe-pointed scissors are apparently never used. All the scissors I have seen for squint operations and dissections of the skin in plastic work are sharp-pointed and curved on the flat. With such scissors, then, the usual incision is made, the conjunctiva is separated up into quite a large pocket, and one blade of a Prince pattern clamp forceps (with longish blades) is inserted into the capsule, and under the tendon. The conjunctiva is then pulled forward to its original position, and the upper blade of the Prince forceps clamped down upon everything—tendon, capsule, and conjunctiva—the parts being as nearly as possible *in statu quo ante*, except that they are clamped in the forceps. With the sharp-pointed scissors the tendon is divided at its attachment, and the whole flap lifted up and cleared underneath. Three silk sutures are inserted through conjunctiva, capsule, and muscle, the flap is shortened by abscising it behind the Prince forceps, and the three sutures are attached at the cornea in the usual way, the middle one being inserted first, exactly in the horizontal meridian, and very close to the limbus. As the sutures are knotted, an assistant rotates the eyeball strongly towards the operated muscle. Double bandaging for a week.

Excision and Evisceration of the Eyeball. Protheses.—I should like next to say something regarding excision under local anæsthesia and about the transplantation of fat into Tenon's capsule. It is hardly necessary to say that when the operation is performed under local anæsthesia no transplantation is made. In ordinary cases, transplantation is the rule.

The particular case which I saw was that of an oldish man with a cardiac complaint, and, I fancy, also a great fear of chloroform. Before he came on to the table an ordinary subconjunctival injection of novocaine and adrenaline had been given. (Note.—In the Freiburg *Augenklinik*, novocain B., of Meister, Lucius, and Bruning, is employed for subcutaneous injection.)

On the table, with a very long, curved, flexible needle, an injection was made round the eyeball on the nasal side. Next, with a similar long needle, straight this time, an injection was made at the temporal side. Finally, a small injection was made subcutaneously at the outer canthus. In using these long needles thus introduced into the orbit, it is advisable first to pass the needle alone. If no blood comes, attach the syringe and proceed. If blood emerges, then a fresh point for the injection must be chosen, since it would not be wise to make the injection into an orbital vein.

The operation was commenced immediately. The outer canthus was slit, the tendons carefully picked up on the hook and divided, the optic nerve severed with one snip and the operation completed by inserting conjunctival sutures. There was no undue haste, no exclamation from the patient; nothing, in fact, to indicate anything unusual from the side of surgeon or patient. The operation was absolutely smooth. I shall have something further to say about Siegrist's method when dealing, as I shall do in a subsequent article, with the Berne *Clinique*.

Next, as to the transplantation of fat. As Axenfeld humorously observed, it is usually easier to obtain fatty tissue from the abdominal subcutaneous tissue of a German than of an Englishman. However, there is always the gluteal region. First, a strip of skin is excised from the abdominal wall, the incisions being larger or smaller according to the thinness or thickness of the underlying adipose tissue. The layer of fatty tissue is then removed from the underlying muscle over a superficies corresponding to the gap in the skin. This fatty tissue is placed in warm saline. An assistant stitches up the skin wound while the operator proceeds with the excision of the eye. In doing this the conjunctiva is dissected up all round, and the recti muscles picked up one by one, fixed in Prince's forceps, detached from the sclera and threaded on to a continuous silk suture. The end of the suture is passed through the muscle first threaded, the internal rectus, so that the four recti are on a tobacco bag suture. The globe is then removed. The mouth of the bag, composed of capsule and muscles, is held open and the fat inserted to a sufficient amount. Bleeding should be stopped before the fat is inserted.

The tobacco bag suture is then drawn, but not tightly drawn, over the contents of the capsule, and the ends are tied in a bow knot of considerable size. The intention is to unite the muscles at the apex of a cone, not to tie them in a knot. Next, the conjunctiva is sutured with vertically-placed stitches, but the bow knot is excluded and left in front of the conjunctiva. Thus, when thought proper to do so, the tobacco bag suture can be withdrawn. Axenfeld prefers this method to that of buried absorbable sutures, and the results certainly seem excellent *quâ* the mobility of the stump.

In another case the globe was eviscerated and the fat transplanted into the scleral cup. Silk sutures were employed, the conjunctiva and sclera being stitched together, not separately. I do not know the after-history of this case, which was a private one.

In connection with the transplantation of fat, Axenfeld points out that fats vary in their consistence, vary in fact in their chemical composition, in different individuals. The more oily classes of fat shrink more than the denser classes, and allowance must be made accordingly as to the extent to which the cavity is packed.

Just a word about the prothesis. At stated intervals, the firm of Müller, of Wiesbaden, sends representatives to Freiburg to make glass eyes for all the patients who have lost their eyes in the interval since their last visit. The patient sits beside the glass-blower, who makes the eye to match the sound eye "while you wait." Could anything be more satisfactory?

Excision of the lacrymal sac and gland. — Axenfeld's method of excision of the sac is too well known to require repetition. The description of the operation for extirpation of the palpebral portion of the gland will be found in a recent volume of the *Klinische Monatsblätter für Augenheilkunde.*

The essential point in this operation is that the upper lid is not ectropionized, as in de Wecker's method. The upper and lower lid edges at the outer canthus are held apart with small double-toothed blunt-hooks. The operation can be quite easily performed under local anæsthesia.

I should like to mention a useful little detail in connection with the control of bleeding in plastic and lacrymal sac operations. Some score or more of tapering wooden sticks, about 8 in. long, are wrapped at one end with cotton and sterilized. With these swab-sticks firm pressure can be maintained in the depth of a wound with a minimum of trouble, and the swab can be removed from the wound with a maximum of rapidity. The swab may be used dry or soaked in adrenalin or cocain.

Diagnostic and Therapeutic Methods.

I have already occupied so much space in the description of the Freiburg *clinique* and of operative *technique* that I shall confine my remarks under the above heading within quite narrow limits.

As is the case with operations, so also with diagnosis and therapeutics, there are certain subjects which are of outstanding interest to everybody. Such, for instance, are the diagnosis and treatment of syphilis and tuberculosis, the treatment of trachoma, and the diagnostic value (or otherwise) of the "trachoma bodies," the treatment of pneumococcal serpent ulcer of the cornea, the value of sera and vaccines, and so forth. My time in Freiburg, however, has not been occupied very much with therapeutic methods and I am unable to take up such in any detail.

In Freiburg out-patients *syphilis* is relatively rare, whereas *tuberculosis* is extremely common. Recognising that both diseases may be factors in the causation of any given case, Axenfeld is in the habit of testing many of his patients for both diseases by means of the Wassermann and tuberculin reactions.

Treatment of syphilis with "606" has not been much employed. The ordinary methods are relied on. In some cases the use of massive doses of potassium or sodium iodide has given good results.

Treatment of chronic ocular tuberculosis with tuberculin has been largely employed. I shall not commit myself to too much detail, but essentially the method employed is to use smaller doses than those of v. Hippel, although greater than those recommended by Sahli, and, further, instead of constantly increasing the dose up to the point of reaction and then reducing it, Axenfeld seeks to find for his patient a "standard" dose. When the case has been studied in hospital with all due regard to movements of temperature, to the general health, and so on, a subcutaneous diagnostic injection of Koch's old tuberculin is given. The first dose is 1 milligram. If in two days there is no local or general reaction—and it is a point with Axenfeld that he pays special attention to local reaction in the eyeball, such as the appearance of a new spot of choroidal tubercle, an increase in vitreous opacity, and so on—if, I say, there is no reaction, 5 milligrammes are injected. If, after this, there is still no reaction, or if a positive reaction is doubtful, another similar dose is given. Only occasionally is it necessary

Tuberculin

to proceed to 10 milligrammes. If no reaction follows even 10 milligrammes the result is called "not positive," but tuberculosis is not thereby excluded (for further details see Axenfeld's *Bacteriology of the Eye*).

The result being considered positive, treatment is commenced with bacillary emulsion (from Meister, Lucius, and Bruning, Hoechst-a-Main), the first dose being a quarter of this firm's fifth dilution and equivalent to $\frac{1{\cdot}25}{1{,}000{,}000}$ of a milligram of bacillary substance. No reaction occurring, a somewhat greater dose is given each week until for the patient a "standard dose" has been found. This "standard dose" is considerably below the patient's reacting dose. When the case has been sufficiently studied in hospital, the patient is sent out and attends as an out-patient for further treatment with tuberculin. He receives, as an out-patient, only his "standard dose." The treatment lasts a year or more.

With regard to serum and vaccine therapy, other than the treatment of tuberculosis with tuberculin, the smallness of my knowledge of the subject of immunity makes it advisable that I should say very little. I think, however, that I am on sure ground in saying that so far as ocular diseases are concerned, Axenfeld holds that we must pin our faith to the well-tried remedies suitable for the particular case. Thus, if we find that a corneal ulcer is due to the diplo-bacillus, we treat it with zinc, and if due to the pneumococcus, with atropin, hot applications, the cautery and the Guthrie-Saemisch section, *secundem artem*. We may use serum treatment, but must not depend upon it. Vaccines from the patient's own strain of pneumococcus take too long to prepare. Diphtheria of the conjunctiva is, as everyone knows, amenable to serum treatment, but the corneal ulcerations occurring in association with the conjunctival diphtheria are not so. "This is due to the fact that the inflammation and ulceration are not due to the diphtheria bacilli, but to secondary infections with other organisms" (Axenfeld, *loc cit.*).

If there is one thing more than another which I have heard about in Freiburg, it is the preponderating influence of the pneumococcus as a cause of dangerous bulbar infection.

In a previous paragraph, dealing with prophylaxis in intra-bulbar operations, I have stated that Axenfeld gives an injection, before operation, of anti-pneumococcic serum, in cases in which the operation is undertaken in the presence of conjunctival pneumococci. How does this square with the view that such serum is of small value in corneal pneumococcic ulcer? The following statement (Axenfeld, in a clinical lecture) will suggest the answer:

(1) The flow of fluid through the intact eyeball is extremely slow, and the influence of anti-bodies in that fluid correspondingly slight.

(2) When an eyeball is opened by drawing off aqueous, and still more when the lens is extracted; also when subconjunctival injections are made; the circulation of fluids is increased, the albuminous matter is increased in these fluids, and correspondingly the anti-bodies are increased.

The truth of these statements is demonstrated by Axenfeld in a most striking way.—A series of patients who have had intra-bulbar operations performed, but who among them have some normal eyes, are given 5-7 grammes of fluorescein in coffee about half-an-hour before being examined. They will all present a marked "icteric" hue of the skin, while the recently operated eyes show a marked green staining of cornea and aqueous; the less recently operated eyes a lesser degree of staining; and the normal eyes no staining. The demonstration is a most remarkable one as showing the increase in the flow of fluids through injured eyes, and it indicates why the injection of anti-pneumococcic serum may help in the defence against the pneumococcus in an operated eye, although it will not do so in an intact eye. So also, when a pneumococcic corneal ulcer is incised, there is an outpouring of anti-bodies into the freshly-secreted aqueous.

One or two more points and I have done. When it is desired to produce diaphoresis the electric light bath is largely employed. The patient cools off under blankets on a couch in the bathroom. Pilocarpine is never employed.

Aspirin in massive doses has been found of service in some inflammatory conditions.

Lactic acid, 50 per cent., is employed in tuberculous conjunctivitis and scleritis. It is applied in very small quantity to the ulcers, and the eye is then flooded with saline.

Trachoma is rare in Freiburg, I shall postpone its consideration until I have visited a trachomatous district.

I am much indebted to Professor Axenfeld for his permission to publish these notes from his *clinique*, and to him and to Dr. v. Szily for their kind help in reading the proofs and checking the various descriptions and statements made.

ZÜRICH, December 11th, 1911.

CURRENT LITERATURE.

NOTE.—Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—CONGENITAL ABNORMALITIES.

(FIRST NOTICE.)

(1) **Roland.—A case of cyclops. (Un cas de cyclopie.)** *Gazette des Hôpitaux*, 16 janvier, 1908.

(2) **Wernicke, Otto.—Congenital aniridia.** *Anales de Oftalmologia*, Febréro, 1908.

(3) **Mathewson, Geo. H.—Accessory eyelid.** *Montreal Medical Journal*, October, 1908.

(4) **v. Szily, A.—Contribution to the occurrence of congenital accessory iris-tissue. (Beitrag zu den Befunden von angeborenem akzessorischem Irisgeweber.)** *Klin. Monatsbl. f. Augenheilkunde*, April, 1909.

(5) **Hansell, Howard.—A congenital connective-tissue formation in the vitreous, probably arising from the optic nerve.** *Archives of Ophthalmology*, May, 1909.

(6) **Hack, R.—A rare malformation of the optic disc. (Eine seltene Misbildung am Sehnerveneintritt.)** *Arch. f. Augenheilk.*, Juni, 1909.

(7) Lauber, H.—The so-called retinitis punctata albescens. (Die sogenannte Retinitis punctata albescens.) *Klin. Monatsbl. f. Augenheilkunde*, Februar, 1910.

(8) Tooke, Frederick T. — On so-called doubling of the puncta lacrimalia. *Montreal Medical Journal*, January, 1910, and *Ophthalmology*, April, 1910.

(9) Purtscher, O.—Congenital, atypical coloboma of the iris, directed upwards. (Angeborenes atypisches Iris-Kolobom nach oben.) *Centralbl. f. prak. Augenheilk.*, April, 1910.

(10) Paterson, J. V.—A case of congenital partial palsy of the third nerve with cyclical contraction and dilatation of the pupil. *Ophth. Review*, May, 1910.

(11) Palomar.—A case of double symmetrical incomplete congenital aniridia. *La Clinique Ophtalmologique*, 10 mai, 1910.

(12) Cole-Baker, L.—Absence of puncta lacrymalia (bilateral). *Proceedings of the Royal Society of Medicine*, July, 1910.

(13) Seefelder.—On the etiology of bilateral congenital corneal opacity, with a report of three cases. *Archives of Ophthalmology*, July, 1910.

(14) Jones, Leonard W.—Congenital dislocation of the lacrymal gland. *Ophthalmology*, October, 1910.

(15) Dujardin.—Subconjunctival ostema of dental form. (Osteome sous-conjonctival de forme dentaire.) *Ann. d'Oculistique*, décembre, 1910.

(16) Terlinck, H.—A case of congenital fistula of the lacrymal gland. (Ein Fall von angeborener Fistul der Tranendrüse.) *Zeitschrift für Augenheilkunde*, Dezember, 1910.

(1) **Roland**, in describing to students a case of cyclops, refers to the various forms of this monstrosity, and discusses the embryology thereof.

ERNEST THOMSON.

(2) Cases of congenital aniridia are not very frequent, and therefore **Wernicke** (Buenos Ayres) publishes the following.—J. I., an Argentinian; parents and brothers healthy; the eyes of the boy, 12 years old, defective from birth, according to his mother; the lad is healthy, and presents no other anomaly. Photophobia to direct light; external parts normal in both eyes; horizontal nystagmus. The intra-ocular changes almost equal in both eyes, attracting attention by their dark color, not allowing either the iris or the pupil to be perceived by oblique illumination; cornea transparent, except in an opaque zone, 2 millimeters in width, around the limbus; anterior chamber normal; no signs of iris to be seen. The crystalline lenses, irregularly circular, are luxated upwards, their upper edge touching the limbus with a zone of aphakia, 3 millimeters in width, remaining downwards: both crystaline lenses show on the periphery opaque grooves and on the posterior cortical masses white spots. Neither the zonule nor the ciliary body could be perceived. Fundus of the eyes normal. Distant vision reduced to counting fingers; near vision, right eye, Wecker No. 5 at 8 centimeters, left eye, Wecker No. 4 at 6 centimeters. The author proposes tattooing as a remedy for the photophobia, either when the lenses have been successfully extracted, or when the latter are quite transparent. J. DE J. GONZALEZ.

(3) A small tumour situated at the inner angle of the eye between the margins of the eyelids, attached to the upper lid at a point to the nasal side of the juncture by a slender pedicle, is considered by **Mathewson**, after microscopic examination of its structure, to be an accessory eyelid.

ERNEST THOMSON.

(4) **v. Szily's** patient, a boy aged 17 years, showed the following bilateral eye-changes.—A most unusual deformity of the iris, anterior polar cataract, nystagmus, and chronic glaucoma, whereby vision was reduced to the counting of fingers. The real iris appeared to be covered by a second membrane and was only visible through peculiarly shaped defects in the latter. The pupils were dilated and devoid of reaction. The accessory membrane was nowhere attached to the lens and had all the appearances of iris-tissue. That it really consisted of such was verified by microscopical examination. Iridectomy was performed on the right eye, and a piece, four mm. broad, removed above from the neighbourhood of the coloboma-like defect seen in the illustration. It must be remarked that after the operation, the remnant of vision was lost, and an iridectomy performed on the left eye by another surgeon ended even more disastrously in phthisis bulbi. While the periphery of the excised piece showed a normal structure, its centre was twice the normal thickness. The thickening was due to an even increase of the fibrous elements. In the region of the circulus iridis minor this tissue separated into two layers of unequal size : a posterior shorter, which formed a normal pupillary margin, and a much thicker anterior layer of a dense cellular structure, which projected considerably beyond the margin of the real iris. Such a superabundance of tissue cannot be explained by the assumption of a mere arrest of development. There was distinctly more tissue formed than would be present at any stage of normal fœtal life. As to the polar cataract, the author refers to the inclusions of amnion in the lens vesicle of bird's eyes, which have been found by v. Szily, jun. C. MARKUS.

(6) In this case reported by **Hack**, of Würzburg, the optic disc was considerably larger than normal. It contained in the centre a white star-shaped body with a silky lustre, and was surrounded by a yellowish, pigmented halo. There was no cup. The retinal vessels appeared at the margin of the disc and were arranged in radial fashion. Each vessel was outlined on both sides by a broad white strip, which accompanied it for some distance into the fundus.

P. J. HAY.

(7) **Lauber** found in four out of six children, the progeny of consanguineous parents, a condition characterised by hemeralopia and a peculiar ophthalmoscopic change : the fundi were covered with minute white spots which were absent only in the macular region to the extent of two disc-diameters, and were situated deeper than the retinal vessels. Two of the patients were boys and two girls ; the eldest was 28, and the youngest 5½ years old. Colour perception was perfect, except in one boy who showed a slight anomaly with Nagel's colour-test. The fields, which were normal in good light, became considerably constricted in twilight. The discs and retinal vessels had quite a normal appearance, and the condition was evidently stationary. Most cases described in literature are of this benign type, but others have a more serious aspect, the impairment of central vision, narrowness of retinal vessels, and waxy look of the discs recalling pigmentary degeneration of the retina. Intermediate cases are also known. Only to the graver condition should the name of " retinitis punctata albescens " be applied : for the mild cases Lauber proposes the term "*fundus albipunctatus cum hemeralopia congenita*." The pigmentary epithelium may be presumed to be the seat of the lesion. C. MARKUS.

(8) In addition to the not very uncommon malformation of double puncta

lacrymalia, one of **Tooke's** patients presented a musculo-fibrous band extending from the second punctum across the caruncle, to which it was adherent, to a corresponding point on the margin of the upper eyelid. This congenital ankyloblepharon is rarely seen. SYDNEY STEPHENSON.

(9) **Purtscher**, of Klagenfurt, records a case of a child, four years old, which was brought to him on account of an overflow of tears from the left eye. The right eye was perfectly normal in every respect. The left was full of tears. The lower lid had slight ectropion. At the position of the lower punctum was a long and slightly gaping cleft. The region of the tear sac was slightly swollen, and on pressing on it, some thick mucus appeared in the conjunctival sac, and at the same time a large drop of the same secretion issued from a very fine fistula situated underneath the left nostril in the skin of the upper lip. In addition, the left eye had a coloboma of the iris directed straight upwards. The iris was blue-grey in colour, and the whole pupil was displaced slightly upwards. The pillars of the coloboma were slightly oval and tended to converge upwards. The large and small circles of the iris were well differentiated and could be traced along the whole pillar. Nowhere was there any indication of an incarceration of the iris in a wound, nor the scar of any wound in the limbus or cornea. Vision = 3/30.

To pass a probe into the nasal duct was quite easy, but another probe passed into the fistula could not be made to touch the first probe.

The author has no doubt that both the coloboma of the iris and the dacryocystitis were congenital. He discusses the theories as to the causation of these atypical colobomas, and favours the view of Hess, who has described in these cases, strands (remains of mesodermal origin), running from the disc to the posterior pole of the lens, and from there around the lens to the choroid near the limbus. These strands interfere with the development of the iris, and account for atypical colobomata, and, naturally, they may occur in any position.

A. LEVY.

(10) **Paterson's** patient was a girl, aged four years. The palsy consisted of right ptosis with defective elevation ; the cycle of variation in the pupil lasted about 30 to 40 seconds ; the size of the pupil varied between 2½ mm. and 5 mm. ; the movements were wave-like and dilatation was much longer than contraction. The pupil reacted to all stimuli, directly and indirectly. Refraction was emmetropic, and vision full in both eyes. A. H. PAYAN DAWNAY.

(11) **Palomar**, of Saragossa, gives a clinical description of a case in which irides were absent down and out ; while the lenses were cataractous and displaced upwards and inwards. Vision of 1/8 in each eye was obtained through the aphacic interval between the lower edge of the lens and the limbus of the cornea. ERNEST THOMSON.

(12) **Cole-Baker**, of Southsea, reports the case of a child of 10 years with epiphora since birth. One gathers from the absurdly condensed report that when it was found impossible to locate the drainage channels, both lacrymal glands were removed. No after-history is given. ERNEST THOMSON.

(13) **Seefelder** prefers to consider the larger part of congenital leucomata on an undoubtedly inflammatory basis as due to a prenatal inflammation of the anterior uveal tract with simultaneous or consecutive involvement of the cornea, rather than to a prenatal infection through the unruptured membranes. Against the latter view, he urges that severe conjunctivitis, especially gonorrhœal, shows no tendency to spontaneous healing, and also that it is a question whether amniotic fluid swarming with virulent pyogenic germs would be compatible with the continued health of the fœtus. In all his three cases, the mothers had an undisturbed puerperium. ROSA FORD.

(14) **Jones** describes and illustrates by a photograph a child of ten in whom

the lacrymal gland of the left side was seen as a tumour 15 mm. in length and 10 mm. wide, under the bulbar conjunctiva slightly above the insertion of the external rectus muscle. It could easily be displaced upwards by the finger, but returned of its own accord to the lower position. There was no pain and no alteration of vision. A. J. BALLANTYNE.

(15) **Dujardin's** patient, a girl aged eight, had a rounded tumour in the conjunctiva of her left eye near the external angle, in the interior of which a hard mobile body could be felt. This had been present from birth, and was said to be increasing in size. The conjunctival cyst was incised, and a bony body, 1 cm. long, removed from it. This resembled a true canine tooth with its crown of enamel, fissures, and single root. R. J. COULTER.

(16) **Terlinck** (Brussels).—In this case, which is illustrated by a photograph, the eye was absolutely normal. At a spot 8 mm. distant from the lid margin, on the temporal aspect of the left upper lid, there was an opening, just under 1 mm. in diameter, covered by long and short hairs, from which constantly fell clear tears. An attempt to evert the lid evoked a copious flow of tears, which poured from the opening and from the palpebral fissure: about an equal amount came from each. When the child ceased crying, the flow diminished to the normal again. The child was obliged constantly to wipe away these tears from his cheek. During sleep no tears flowed from the fistula. A probe could be passed for 6 mm. horizontally along the fistula, when it turned inwards towards the orbit. The thick-walled canal was dissected out, under anæsthesia, as far as the tarsus edge. Here it was cut off, and the thin-walled end sewed into the fornix. The wound had fully healed in 14 days. Then, a vesicle formed just over the outer canthus; this was translucent, and contained a transparent fluid which showed a few pus cells. Another fistula formed here. Apparently, nothing more has so far been done to the case. Probably, it would be best to eradicate the gland *in toto*. T. HARRISON BUTLER.

II.—THE BOWMAN LECTURE, 1911.

Landolt, Edmund.—On Ophthalmic Surgery. *Trans. Ophthalmological Society U.K.*, Vol. XXXI, Fasc. 3, 1911.

The Bowman Lecture of the Ophthalmological Society of the United Kingdom was delivered on June 7th, 1911, by **Landolt**, of Paris, who took as his theme the surgery of the eye.

He gave reasons for looking upon ophthalmic surgery as a separate art rather than as general surgery applied to a particular part of the body. He recalled his experiences in what he termed the "pre-ophthalmological era." He would never forget the sort of smothered rage with which a general surgeon was wont to exclaim: "Shall I never enucleate an eye without penetrating the globe!" He contrasted with this the calmness of another general surgeon, who told the indignant spectators when they saw the vitreous escaping repeatedly in a series of cataract extractions: "Gentlemen, when you have performed as many cataract operations as I have, you will no longer be impressed by the loss of the vitreous body." The well-known French surgeon Samson even admitted: "Loss of vitreous occurs sometimes so suddenly that before the operator has even perceived its escape, it has glided into his sleeve." At the same time, although the surgery of the eye has been for many years in the hands of specialists, we still remain, more so than we sometimes think, under the influence of general surgery. One proof of this is to be found in the shape of most of the instruments we employ in our work. Landolt enters carefully into this question, and describes many improvements that he has made in scalpels, forceps, keratomes, and some other instruments used in operations upon the eye.

As regards ambidexterity, Landolt does not blame the man who, although able to manage with his left hand many instruments, performs the more delicate operations, as those for glaucoma or cataract, with his right hand. The best position for the operator is standing, while the patient should lie upon a bed or a simple kind of operating table, somewhat higher than an ordinary bed. A narrow table has advantages.

Landolt, after these preliminary observations, passes on to consider the chief operations of eye surgery. It would be difficult to abstract this portion of the Lecture fully, but we may select a few points from among the many he mentions :

In paralysis of the superior oblique he has obtained excellent results by advancing the inferior rectus muscle.

Even persistent epiphora, in Landolt's opinion, does not warrant the complete removal of the lacrymal gland.

The popularity of tenotomy is largely due to an erroneous conception of the ætiology of strabismus, to a lack of physiological knowledge, and to an ignorance as to the effect of operations upon the muscles of the eye. He shows the fallacy inherent in three widely accepted axioms regarding the ocular muscles : (1) that the excursions of the eyes are normal in concomitant strabismus ; (2) that tenotomy of one muscle diminishes its influence on rotation of the globe and increases that of its antagonist ; and (3) that in convergent strabismus there is an excess of strength in the adductors.

Advancement, together with more or less extensive resection of the muscle, performed upon both eyes, is enough, in Landolt's experience, to correct any degree of strabismus. For many years the author has given up tenotomy as a means of increasing the effect of advancement. The operation of advancement should be performed boldly : the muscle should be fixed as close as possible to the edge of the cornea ; a marked, though temporary, over-correction should be aimed at ; both eyes should be bandaged, even if one alone has been operated on ; and the sutures should not be removed for seven or eight days. Exercises for binocular vision should be commenced as soon as the dressings are left off. After all, the operation for squint does not aim at straightening a crooked eye, but at re-establishing a function, namely, that of stereoscopic vision.

Landolt recalls with feelings akin to terror (as, indeed, who does not ?) the pre-aseptic period. Suppuration was then a common sequel of operation. One of Landolt's teachers, so great was his terror of finding suppuration, always left to Landolt the unenviable task of visiting his patients for the first few days following a cataract extraction ! But no figures are required to demonstrate the results then and now. Landolt sets out to enquire in what way the asepsis of ophthalmic surgery differs from that of general surgery. Cutting instruments should traverse the tissues of the eye "like the very thought of the surgeon," as Landolt finely phrases it. Hence, no plan of sterilization is permissible that affects in the slightest the sharpness of the blade or point. Landolt himself on this account no longer boils his instruments, but sterilizes them by dry heat instead. For operations that involve opening the eyeball—*e.g.*, cataract—the eyelashes are clipped close, so that the edge of the eyelid may be thoroughly cleansed. The field of operation cannot be completely sterilized by any means at our command, but the parts are kept constantly laved by an aseptic fluid in the shape of the tears. This circulation of fluid is rendered possible by the movements of the eyelids, so that the best treatment would be to leave an eye without dressing after operation This ideal, however, is hardly practicable. Landolt believes that slight movements of the eyelids are calculated to do more good than harm. He therefore avoids, as much as may be, any pressure of the bandage on the eyelids after operation. He has also a word of praise for the use of Fuchs' wire guard after operation upon the eyeball.

Landolt's remarks upon "statistics," especially as applied to the results of operations for cataract and strabismus, deserve to be taken seriously to heart. Figures deserve no more credence than words, unless based on sound reasoning. He tells the amusing story of a very distinguished colleague, who tried to establish the ætiology of strabismus by enumerating all the causes to which the condition was attributed by the patients and their parents. He noted how many times the child's cradle had been badly placed, how many times the mother had experienced a fright, and so forth. The figures were added up, a percentage was taken, and on this was based the argument as to the causes of strabismus. "As if," remarks Landolt, "by adding up many bad reasons, it were possible to arrive at a good one." Attempts to compare simple with combined extraction of cataract, based upon the visual acuity obtained by the two methods, are often fallacious, since the simple operation is usually reserved for the more favourable cases only. Indeed, statistics could decide the superiority of one method over another only if the same surgeon were to operate on a great number of cases, as similar as possible, by the various plans.

Landolt's lecture, which is couched in really excellent English, is one which no ophthalmic surgeon can afford to overlook. SYDNEY STEPHENSON.

REMEDIES.

(FIRST NOTICE.)

(1) **Blanco, Sans.—Salvarsan in ophthalmology.** *Rev. de Med. y Cir. Practicas*, June 28th, 1911. Ref. in *Brit. Med. Journal*, October 28th, 1911 (256).

(2) **Juseluis, E.—Tuberculin in ophthalmic practice.** *Finska Läkar. Handlingar*, 1911, p. 298. Ref. in *Brit. Med. Journal*, October 21st, 1911 (240).

(3) **Lang, William.—A clinical lecture on the treatment of gonorrhœal iritis by vaccines.** *Archives of the Middlesex Hospital*, Volume XXII, Clinical Series No. VII, 1911.

(4) **Harston, G. Montagu.—A report on fifty cases of trachoma treated with carbon dioxide snow.** *British Med. Journal*, July 15th, 1911.

(5) Chronis, Panos.—Two cases of ocular inflammation after Salvarsan injection. (Ueber zwei Fälle von Augenentzündungen nach Salvarsan-Injection.) *Klin. Monatsbl. f. Augenheilk.*, Oktober, 1911.

(6) Stock, W.—Benzosalin in sympathetic ophthalmia. (Ueber Benzosalin bei sympathischer Ophthalmie.) *Klin. Monatsbl. f. Augenheilk.*, Oktober, 1911.

(7) Citres, Dufaure de.—Iodine collyria in ocular therapeutics. (Les collyres iodés en thérapeutique oculaire.) *La Clinique Ophtalmologique*, 10 octobre, 1911.

(8) Servel, P.—On the treatment of certain detachments of the retina by agents to reduce blood tension. (Du traitement de certains décollements de la rétine par les hypotenseurs.) *La Clinique Ophtalmologique*, 10 octobre, 1911.

(9) Theobald, Samuel.—A protest against the indiscriminate use of the organic compounds of silver in ophthalmic practice. *Johns Hopkins Hospital Bulletin*, November, 1911.

(10) Derby, George S., and Pratt, Horatio N.—The use of serum in sympathetic ophthalmia. *Archives of Ophthalmology*, November, 1911.

(11) Bailliart, P.—The action of salvarsan upon the eyes. (L'action du salvarsan sur les yeux.) *Bull. Gén. de Thérapeutique*, 8 novembre, 1911.

(12) Britto, Victor de.—On subconjunctival injections of the salts of mercury in infective ulcers, gummata, choroido-retinitis, retro-bulbar neuritis, and so forth. (Des injections de sels d'hydrargyre dans les ulcères infectieux, les gommes, les chorio-rétinites, les névrites rétrobulbaires, etc.) *La Clinique Ophtalmologique*, 10 novembre, 1911.

(1) **Blanco** discussed at a recent meeting of the Academia Medico-Qúirurgica Española the use of "606" in syphilitic affections of the eye. At the outset, he said, the question arose to what extent the use of arsenobenzol was liable to be followed by the unfortunate results which had occurred after the use of the closely allied atoxyl and arsenacetin. Some cases of retrobulbar neuritis have been reported after the injection of the drug; also a case of peripheral choroiditis, with opacities in the vitreous. Finger has recorded a case of paralysis of the third and sixth nerves undoubtedly due to salvarsan. Still, on the whole, these cases seem to be extremely rare, and even these are not with certainty to be ascribed to the drug. The author himself has seen no cases of the kind. Nevertheless, in view of our limited experience, he considers that the fundus oculi should be examined in every case before treatment with salvarsan, and where any serious non-syphilitic disease is present, its use should be regarded as contraindicated. The cases treated by the author include chancres of the conjunctiva and eyelids, episcleritis, choroiditis, chorido-retinitis, neuritis and subsequent atrophy. In a case of the last-mentioned disease Hirsch obtained a notable enlargement of the field of vision. The best results were in cases of syphilitic iritis.

(2) **E. Juseluis** draws attention to the tardy recognition of the frequency of tuberculous disease of the eye. Fuchs, in his standard work on the eye, published in 1898, states that "the majority of cases of parenchymatous keratitis are due to congenital syphilis. A few are due to scrofulosis or tuberculosis, and there is frequently no apparent cause." This disease was traced ten years later in every other case to tuberculosis, whereas it was traced to syphilis in only 22 per cent. of all cases. Tuberculosis of the eye appears as

keratitis, iritis, with or without deposits in the iris, retinal infarcts, and choroiditis, which, in the form of disseminated choroiditis, is the commonest of all. The course of these diseases is usually chronic, and spontaneous recovery may occur. Usually, however, the condition passes from acute to chronic, and this stage is again succeeded by an acute phase when the patient's general vitality is lowered. The prolonged and almost painless course of the disease leads to its neglect by both patient and practitioner, who therefore fails to restore the eye to complete health. Hitherto these conditions have been empirically treated with mercury, zinc lotions, salicylates; but recently tuberculin, given subcutaneously, has been advocated by many authorities. The writer, who used new tuberculin (T.R.) and "endotin"—a tuberculin made in St. Petersburg—gives a detailed report of nine cases of tuberculous iritis or keratitis thus treated. In every case the results were excellent, and recovery was more rapid than with other methods. The following procedure was adopted: The patient's temperature was taken for two consecutive days, and when it was found at any time to be over 98.6° no diagnostic injection was given. Otherwise, a subcutaneous injection of 0.1 to 1.0 mg. tuberculin was given in the morning in the back. When no rise of temperature occurred, a double dose was given on the third day; but if the temperature rose only $\frac{1}{4}$° C., the dose was not increased, nor was it repeated till the temperature had fallen to normal. When repeated, the second dose frequently caused a greater rise of temperature than the first, and this phenomenon was taken as proof positive of the existence of tuberculosis. If, however, the first small doses caused no rise of temperature, the dose was increased to 5 mg., and finally to 10 mg., and if this latter dose, once repeated, produced no reaction, the absence of tuberculosis was proved. After a positive diagnostic reaction, small therapeutic injections were given. The initial dose was at first very small, for fear lest the disease might be disseminated in feeble and scrofulous children; but with further experience the smaller were abandoned in favour of the larger doses, none of which harmed the patient. The opsonic index was at one time the standard criterion for the dosage of tuberculin, and the small doses which kept the opsonic index at a maximum height were preferred. Since 1909, however, it has been admitted that better results are obtained by the larger doses even when the opsonic falls or fluctuates.

(3) **William Lang**, of London, considers the gonococcus to be the most common cause of plastic iritis, which may occur at any time from a few months to twenty-one years after the original urethritis. The inflammation of the eye may recur during a period of twenty or more years. The appearance of the iritis does not usually differ from that caused by syphilis, septic poisoning, gout, etc., but occasionally the anterior chamber may be seen to be more or less filled with grey or yellowish jellylike lymph, which is then characteristic of a gonorrhœal infection. Lang always admits cases of acute plastic iritis to hospital. The local treatment is on the usual lines, *viz.*, atropine drops (1 per cent.) or atropine and cocaine ointment (1 per cent. to 2 per cent.), leeches, hot fomentations, or dry heat. The "Japanese muff warmer" is a convenient method of applying dry heat to the eye. The bowels must be kept open, and sleep secured, if necessary, by narcotics. Massive doses of gonococcus vaccine appear to cure the disease, in Lang's experience, quickly and completely. They seem to prevent recurrences. It is important to inject ascending doses of the vaccine in gonorrhœal iritis. Two doses of 200 million, of 300 million, and of 500 million are given at intervals of a week, and a final dose of 1,000 million, or even a further one of 1,500 million may end the course of treatment. When parts of the body other than the eye are affected, smaller quantities of vaccine are administered. There should be no

reaction, either at the site of the injection or constitutionally, as a result of the injection. SYDNEY STEPHENSON.

(4) Following the example set by N. B. Harman and R. Morton (see THE OPHTHALMOSCOPE, December, 1910, p. 919), **Harston**, of Hong Kong, has employed carbon dioxide snow in the treatment of trachoma. In this way he has treated fifty cases with excellent results. The snow, moulded into crayon shape, is applied directly to the diseased conjunctiva, exposed by eversion of the eyelids. The superior *cul-de-sac* is first treated, and, after that, the tarsal conjunctiva, an interval being allowed to elapse between the two applications and also before the everted lid is allowed to fall back into position. At first, the remedy is applied to each part for fifteen seconds, but when the patient has become used to the treatment, for twenty to thirty seconds. Applications are made once a week. The pain is described as infinitesimal. Pannus and corneal ulcers, for the most part, heal rapidly. A rough analysis of the fifty cases treated by Harston shows:—(1) that the large majority were instances of chronic trachoma, with or without corneal complications; (2) that in individual cases the number of applications ranged from one to eighteen in number; and (3) that cure resulted in all but eight patients, of whom three had failed to continue treatment, and five were still under observation when Harston wrote. SYDNEY STEPHENSON.

(5) Cases have been recorded in which inflammatory eye conditions were observed after the employment of salvarsan. **Chronis**, of Smyrna, is of the opinion that these are not attributable to the drug, as were those following the use of atoxyl. He looks upon them as outbreaks due to the fact that the organism has not been entirely eliminated from the blood. In the two cases which he here describes there were reasons for believing that the optic neuritis and other symptoms which occurred were of this nature.
A. J. BALLANTYNE.

(6) Having found that in some cases the exhibition of large doses of sodium salicylate, as recommended by Gifford, causes the occurrence of toxic symptoms, **Stock**, of Jena, sought for a substitute, and recommends ophthalmologists to give benzosalin a trial. He reports two cases in which he has employed it. The ultimate result in both cases was good. In one there was temporary mental derangement, which disappeared on withholding the drug. Benzosalin can be given to the extent of 20 grammes daily, in 4 gramme doses, with milk or water. A. J. BALLANTYNE.

(7) **Dufaure de Citres**, of Tunis, devotes this communication to describing the methods of using iodine and its virtues in certain affections of the eye. He employs a collyrium which contains one part of tincture of iodine to 120 parts of neutral glycerine. He particularly recommends the use of this medicament in kerato-conjunctivitis, as well as in some cases of secondary glaucoma with corneal ectasia. Finally, he claims that iodine has a specific action in the tarsal manifestations of trachoma and of spring catarrh. For the conditions last-named the author employs a solution which contains iodine, 10; potassium iodide, 20; and glycerine, 100. With this liquid the exposed palpebral conjunctiva (first anæsthetized with cocaine) is painted, and after waiting for about one minute, the parts are brushed with glycerine of starch. SYDNEY STEPHENSON.

(8) **Servel**, on the strength of a single and recent case of detachment of the retina, cured by the dorsal decubitus, wet cups, and massive doses of guipsine, advises that the arterial pressure should be investigated in detachment, and if found to be raised, should be reduced by hypotensors. He gives the preference to guipsine, since it is non-cumulative and exerts no depressing influence upon the heart. SYDNEY STEPHENSON.

(9) **Theobald**, of Baltimore, enters the lists against what he calls "the indiscriminate use" of the organic compounds of silver in eye work. His complaint is that those preparations are responsible for many cases of argyria. Before they came into use, silver-staining of the conjunctiva was rare, and practically never seen except in chronic cases of trachoma. At the same time, Theobald makes it plain that he entertains no unreasonable prejudice against the newer preparations of silver, although in acute and chronic catarrhal conjunctivitis he prefers to either protargol or argyrol a collyrium containing half a grain of zinc sulphate and ten or twelve grains of boric acid to the ounce. SYDNEY STEPHENSON.

(10) Following the example set by zur Nedden in the year 1906 (*Arch. f. Ophthal.*, Bd. LXII, S. 193), **Derby**, of Boston, and **Pratt**, of Louisville, have employed serum obtained from cases of sympathetic ophthalmitis in the treatment of that disease. They have treated four patients in this way. The first patient, a man aged 29 years, developed a severe irido-cyclitis in one eye about a month after a glass wound of the other eye. Within the seventy-two hours immediately following the injection of 23 cc. of serum there was a remarkable change for the better in the condition of the sympathising eye. V., indeed, rose from 20/70 to 20/30. 30 cc. of serum were administered ten days after the first injection. After several recurrences of inflammation in the sympathising eye, and four more injections of from 20 to 30 cc. of serum, to say nothing of one injection of 6,000 units of diphtheria antitoxin, the eye quieted down and eventually retained V. of 20/30. But it is to be noted that the patient was also treated with mercurial inunctions, with massive doses of sodium salicylate, with atropine and hot fomentations, and by incarceration in a dark room. Still, the authors are distinctly of opinion that each of the injections was followed by "a very striking improvement" in the condition of the eye.

As to the other three cases (of which no details are given) Derby and Pratt remark that "in none was the result sufficiently striking and could not be regarded as sure." In conclusion, the following words may be quoted: "Our first case and that of zur Nedden lead us to believe that under certain circumstances the blood serum of an individual who has been a victim of sympathetic disease may be of marked curative value when injected into a patient attacked by the same malady." SYDNEY STEPHENSON.

(11) **Bailliart**, of Paris, proposes to himself the question: What influence has salvarsan upon the eyes? which he then proceeds to answer by reference to cases reported in literature, ophthalmic and otherwise.

Paralysis of the oculo-motor nerves has been noted often enough some time (5-9 weeks) after injection of the remedy. The condition has usually disappeared after fresh injections of "606" or the administration of mercury or iodides. More serious still are affections of the optic nerve determining optic neuritis and leading (as in some of the earlier cases) to optic atrophy and blindness. Instances of papillo-retinitis or papillitis have been reported by Jeanselme and Coutela (1911), Antonelli and Courtois-Suffit (1910), and Geronne and Gutmann (1911). It remains a question whether these affections of the oculo-motor and optic nerves, which occur in the secondary period of the disease, are attributable to salvarsan or to syphilis remaining uncured by the remedy. The evidence appears to favour the view last-named. Yet it is significant that these nervous complications have become much commoner since the employment of Salvarsan.

With regard to the effect of "606" upon syphilitic lesions of the eye, the truth of the matter is that in almost all the cases so far treated, the results have not been superior to those obtained by mercury, and, indeed, they have often enough been inferior. Interesting results, however, have been obtained by Morax with salvarsan in cases of glaucoma, chronic or secondary. In sympathetic ophthalmitis, also, the remedy has acted well. As to the nervous affections of the eye, "606" is almost contra-indicated, or at least it should not be given unless mercurials have failed to improve matters.

SYDNEY STEPHENSON.

(12) **de Britto,** of Porto-Alegre (Brazil), struck by the fact that the subconjunctival injection of mercury is not mentioned in the *Encyclopédie Française d'Ophtalmologie*, enters an energetic plea for its use in hypopyon-ulcer and some other affections of the eye. Among the affections in which he advocates the adoption of subconjunctival injections may be mentioned sympathetic ophthalmitis, sub-acute choroido-retinitis, exudative choroiditis, gummata of the sclera, optic neuritis, and, above all, hypopyon-ulcer. He injects some five drops of a 1:1000 or 1:2000 solution of mercury cyanide, preceded by the injection of a 1 per cent. solution of acoine. The author gives details of several cases illustrative of the value of subconjunctival injections.

SYDNEY STEPHENSON.

CORRESPONDENCE.

[While THE OPHTHALMOSCOPE will at all times welcome correspondence from its readers, the Editor does not hold himself responsible for any views expressed in this column.]

Re REVIEW OF DR. SCOTT'S BOOK—"REFRACTION AND VISUAL ACUITY."

A Correction.

To the Editor of THE OPHTHALMOSCOPE.

DEAR SIR,

I notice that there is a misprint on page 878 of the current number of THE OPHTHALMOSCOPE, in the review which I wrote regarding Dr. Scott's book. On line three from the top appears *ibid* "2½ inches (or 5·7 mm.)" which should be "*ibid* 2½ inches (or 57 mm.)" I rather think that I put it correctly in my note, but cannot be certain.

Yours very sincerely,
LESLIE BUCHANAN.

8, ROYAL CRESCENT,
GLASGOW.
1*st December*, 1911.

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For some considerable time there has been a need for a really efficient lamp for operations. These lamps are required for local work to be held by an assistant, while for other purposes a larger lamp to be used on a stand is required. In the ordinary way, much of the light from the source is lost, owing to faulty lens systems, thus making it necessary to use considerably more light (and a correspondingly larger lamp) than is really required. These difficulties we have overcome by the use of a properly designed lens system. This system is arranged in such a manner that light which normally spreads over a large arc is concentrated into a beam whose angle is considerably smaller. The lamp itself is small, and light. Further it may be used from the mains. A lamp for operating now in use weighs 18 ozs., is $2\frac{1}{8}$ in. diameter and $5\frac{1}{2}$ in. long. It illuminates an area 9 ins. diameter at 18 ins. A further advantage is that the illumination is even at all distances, and owing to the small size of the front of the lamp—$\frac{7}{8}$ in. diameter—it may be used quite close to the object, giving then a small and very intense area of illumination. A demonstration of this lamp will be given at any time.

FUSION TEST.

It will be a matter of interest to many to know that a new series of fusion pictures by Mr. H. H. B. Cunningham are in course of preparation and will very shortly be ready. They will be printed in separate parts so that when an attempt is made to put them together both eyes must be used.

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This instrument is now made in two forms. The usual form is too well known to need description, but the new form is made **self-registering.** It has been a matter of some difficulty to accomplish this owing to the form of the shield. A very simple method has however been adopted, which does not affect the simplicity of operation, but which automatically provides a scaled chart of the visual field up to 30°.

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An **important improvement** has now been made in the examination for service conditions of colour perception cases. It is being realized that in these tests it is essential to use apertures which shall correspond to much greater distances than those now in use, more nearly approximating to the practical conditions. Difficulty however arises with such apertures, partly optical, and partly mechanical, owing to the extremely small apertures required to be proportional to two miles and more when testing at 6 metres. By an effective method we have succeeded in overcoming both the optical and mechanical difficulties, and are now prepared to make an instrument for use with the Edridge-Green Colour Perception Lantern, modifying the present disc of apertures so as to enable tests to be made under conditions closely approximating to a distance of two or more miles at sea.

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BOOK NOTICES.

The Hunterian Lectures on Colour-Vision and Colour-Blindness. By F. W. EDRIDGE-GREEN, M.D.Durh., F.R.C.S.Eng., delivered before the Royal College of Surgeons of England on 1st and 3rd February, 1911. London: Kegan Paul, Trench, Trübner & Co. Price 3s. 6d. net.

In the first of these two lectures Dr. Edridge-Green sets forth his theory of colour-vision, and discusses the facts of colour-blindness. In the second he deals with the practical methods of detecting it.

He is to be congratulated on the admirable clearness with which his theory is enunciated. According to it, the rods are concerned solely with the formation and distribution of the visual purple, which is liberated from them by the action of light. The ends of the cones are stimulated through the photo-chemical decomposition by light of the visual purple in contact with them. The visual impulse thus set up is transmitted to the brain, where it stimulates the "visual centre" causing the sensation of light, and then passes to the "colour-perceiving centre" causing a sensation of colour. The character of the stimulus differs according to the wave-length of the light to which it is due, and the discrimination of these differences is, in his opinion, a function of the brain.

The great objection to this hypothesis is that it is directly opposed to the law of the specific energy of the senses, commonly ascribed to Johannes Müller, but first enunciated in 1785 by Bonnet. One nerve-fibre cannot transmit two different colour sensations, as Maxwell pointed out. The fact that in the skin the sensations of touch, and of pain, and heat and cold are associated with different spots, is an illustration of this law, to which no exceptions are known.

The author's Colour-Perception Lantern, described at length in the second lecture, is extremely well adapted for detecting colour-blindness in signalmen. In one small respect—easily remedied—it is, however, apt to be intensely irritating. The casing round the lamp fits so closely and is so little ventilated that it gets very hot, and the bulbs blacken and the filaments break at inopportune moments, and because neither lamps nor sockets are standard size, the local ironmonger cannot supply our needs, but we must send to London. Let us hope that the recording angel still carries blotting-paper as in our grandfather's day! GEORGE J. BURCH, F.R.S.

OXFORD, ENGLAND.

E. Merck's Annual Report of Recent Advances in Pharmaceutical Chemistry and Therapeutics.* Volume XXIV. 1910. Darmstadt, July, 1911.

Merck's *Annual Report*, as usual, contains many points likely to interest the ophthalmic surgeon. Of these, we may glance at some of the more important.

The value of sodium cacodylate, used either as a 3 per cent. aqueous solution or solution in liquid paraffin, has been described by Galezowski in keratitis bullosa, and by Bonsignorio in ulcerous blepharitis, and in various types of corneal ulceration. In severe forms of corneal ulcer, collargol has been recommended by F. Daxenberger, who has also employed the remedy in cases of ophthalmia neonatorum, dacryocystitis, blepharo-conjunctivitis, trachoma, etc. A good deal of attention is devoted to describing the preparation and employment of von Ammon's eye ointments, which contain very finely divided mercuric and mercurous iodide (Hydr. iodid. rubr. and Hydrg. iodid.). A 0·5 per cent. or 1 per cent. ointment is usually employed. The remedies appear to have a wide range of usefulness in external diseases of the eye, especially in phlyctenular affections. They are said to yield satisfactory results even after other remedies have been used for years without success. The subconjunctival injection of sodium iodate (1 : 1,000) with acoin as a means of treating cataract, traumatic or senile, is described (A. Schiele). Speaking of the non-surgical treatment of cataract, it is of interest to note that Romer now considers that the treatment by "Entocalin" should be limited to checking the advance of early subcapsular cataract.

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*To be obtained free on application to the London Office of E. Merck, at 16, Jewry Street, E.C. Price through booksellers, 1s. 6d.

Of late years a basic aluminum acetate has been introduced under the name "Lenicet," and as a 10 per cent. ointment it is known as "Bleno-lenicet." Good results have been reported from the use of this ointment in the treatment of discharging conjunctivitis, including ophthalmia neonatorum and adultorum. These results, however, have been seriously challenged by Spiro, H. Rayer, and Kummell. Gonococci are said to survive for a long time under this plan of treatment.

Pick's experiences in introducing europhen into the anterior chamber in severe infective injuries and diseases of the anterior segment of the eye are alluded to. Picric acid ointment has given good results in several affections of the eye, such as burns (Fortunati), injuries by foreign bodies, conjunctival catarrh (Ohlemann), and trachoma (Ohlemann). On the other hand, it is useless in vernal catarrh. R. Kaiser has found that lactic acid possesses an almost specific action in cases of conjunctival and scleral tuberculosis. It has but little irritant effect.

Reports still come to hand confirmatory of the value of argyrol. van Lint employs a freshly prepared solution (0.5:5.0) to ward off the ocular complications of measles. According to the same author, staining (argyrosis) is not to be apprehended, provided the use of argyrol be not continued for longer than six months.

A good deal has been recently written about another organic preparation of silver, namely, "Sophol." A 5 per cent. to 10 per cent. solution is advocated by v. Herff in the treatment of ophthalmia neonatorum, and confirmatory reports as to the value of the product have been furnished by Moran, v. Gratkowski, and Grunbaum.

Dionin continues to excite interest in ophthalmic circles. When wide dilatation of the pupils is desired, as in traumatic cataract and severe iridocyclitis, Reif first places a crystal of atropine on the conjunctiva of the lower lid, and, then, exactly seven minutes later, repeats the process with a little dionine. Zirm has emphasised the property possessed by dionin of relieving pain in the eye. This is particularly pronounced in cases of glaucoma. In eyes with raised tension, where operation is out of the question, Zirm recommends the following drops:—Pilocarp. hydr. gr. $\frac{1}{3}$; physost. salicy. gr. $\frac{1}{2}$; dionin, grs. 3; water, $\frac{1}{3}$ ounce.

The internal administration of diaspirin is recommended by B. Sylla, in conjunction with the usual local treatment, in iritis and in many other affections of the eye. The diaspirin is given in gramme doses, and is employed along with hot foot baths and copious libations of hot elderberry tea. The underlying idea, of course, is to encourage profuse diaphoresis.

SYDNEY STEPHENSON.

NOTES AND ECHOES.

Deaths.

WITH regret we announce the death of Dr. Gasparini, of Siena. His chief work was with reference to the importance of pneumococci in connection with diseases of the eye.

The sudden death is announced of Dr. Adam Szulislawski, at the age of 46 years. He worked with Wickerkiewicz at Posen and with Fuchs at Vienna. He settled in Lemberg, where he was connected with the General Hospital. In 1909 he was nominated extraordinary professor of ophthalmology in the University of Lemberg. Death occurred on November 22nd.

Nearer home we have lost Dr. William Millington, who died, at the advanced age of 90 years, on November 5th, 1911. He was one of the founders of the Wolverhampton Eye Infirmary, and a member of its managing committee.

* * * *

Appointments.

Dr. A. EMRYS-JONES has been reappointed a member of the medical board of the University of Wales for a further period of three years.

Mr. H. L. Eason has been appointed as representative of the Faculty of Medicine in the Senate of the University of London.

Dr. W. Uhthoff, of Breslau, has been appointed to the chair of ophthalmology in Berlin as successor to the late v. Michel.

Dr. S. Golovin has been appointed ordinary professor of ophthalmology in Moscow.

Dr. G. A. Berry, president of the Royal College of Surgeons of Edinburgh, has been appointed assessor to the Edinburgh University Court.

Mr. A. E. Burroughs has been appointed assistant surgeon to the Eye and Ear Infirmary, Myrtle Street, Liverpool.

Mr. T. M. Bride has been appointed assistant surgeon to the Manchester Royal Eye Hospital.

Drs. Sachs, of Vienna, and Possek, of Graz, have received the title of professor of ophthalmology.

Dr. W. Grüter has been recognised as *privat-dozent* of ophthalmology in Marburg, and Dr. E. Mani in Turin.

* * * *

Expedition to Samoa.

THE German Colonial Ministry has sent Dr. O. Glantz to Samoa, to study and report upon the infective eye disease prevalent in that island. Dr. Glantz is assistant in the Berlin University Eye *Klinik*.

* * * *

The Middlemore Lecture.

THE annual Richard Middlemore Lecture was delivered at Birmingham on December 7th last by Mr. J. Jameson Evans, who took as his theme "Toxic Diseases of the Eye."

* * * *

The Institute of Ophthalmic Opticians.

THE Council of the Institute of Ophthalmic Opticians has referred to a committee a proposal to establish classes of instruction for opticians with a view to enable them to acquire sufficient knowledge of diseases of the eye to be able to know when disease exists; any intention to encroach on the work of the medical profession was disclaimed. Nevertheless, the proposal seems to be one which will require to be carefully watched; we regard it as an inversion of the proper order of things, and as likely to have an injurious effect on the public health.—*British Medical Journal*, December 2nd, 1911.

THE OPHTHALMOSCOPE.

A MONTHLY REVIEW OF CURRENT OPHTHALMOLOGY.

VOL. X.—No. 2.] *FEBRUARY 1, 1912.* [TWO SHILLINGS.

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ORIGINAL COMMUNICATION

LEBER'S DISEASE AND ALLIED CONDITIONS.*

BY
L. VERNON CARGILL, F.R.C.S.,
OPHTHALMIC SURGEON TO KING'S COLLEGE HOSPITAL, LONDON, ENGLAND.

"LEBER'S Disease," which is known under the synonyms of "Hereditary Optic Neuritis" and "Hereditary Optic Atrophy," is an affection of the papillo-macular bundle of neurones, evidenced by a central scotoma, and terminating in more or less partial atrophy. Both eyes are usually affected, and generally at the same time. The liability to the disease is hereditary. It occurs most frequently in males, usually about the age of twenty years; and it is transmitted by unaffected females.

In the literature of the first half of last century cases were recorded under the designation of "hereditary amblyopia" or "hereditary amaurosis," in which unaccountable blindness occurred in two or more children of the same parentage, or in successive generations of the same family. The discovery of the ophthalmoscope was not made by von Helmholtz until 1851, so that there being no record of the ophthalmoscopic conditions in these cases, it is impossible to say how many of them may or may not have been instances of Leber's disease.

The first description of the disease appeared in 1871 in a classical monograph by Theodore Leber, entitled "Ueber hereditäre und angelegte Sehnervenleiden" (*Archiv für Ophthalm.*, Bd. XVII). In it he recorded eighteen cases occurring in five families; and in a later paper published in 1877 (Graefe-Saemisch *Handbuch*, Bd. V), he added others, amounting to fifty-five cases in sixteen families.

In this country the first important paper was S. H. Habershon's communication to the Ophthalmological Society in 1887, entitled "Hereditary Optic Atrophy" (*Trans. Ophth. Soc. U.K.*, Vol. VIII); and in the twenty-four years since then there have not been more than a dozen contributions to the Society directly concerning this disease. Hormuth's Inaugural Dissertion in 1900 (*Beitr. zur Augenheilk.*, Bd. LXXXIX, Heft xlii) gave a full account of the disease to date and also a complete bibliography.

In 1908, W. I. Hancock made a valuable contribution (*Royal London Ophthalmic Hospital Reports*, Vol. XVII) on twelve male cases in five generations of the same family.

Edward Nettleship, in the Bowman Lecture for 1909, "On some Hereditary Diseases of the Eye" (*Trans. Ophthalmological Society U.K.*, Vol. XXIX) gave an excellent *résumé* and analysis of this disease, together with a number of pedigree charts, and a short abstract of all published cases in chronological order. He also added all other previously unpublished cases of which he could obtain information, and so succeeded in bringing together some 180 separate records, to all of which he appended references.

We owe the clinical elucidation of this disease to the ophthalmoscope, and a renewed interest in it to the resuscitation of Mendel's rules on heredity and the application of them to the transmission of anomalies, deformities, and diseases in man. For the history and full details of recent work on this engrossing subject, reference should be made to the discussion on "The Influence of Heredity on Disease," published in the *Proceedings of the Royal Society of Medicine* (Vol. II, Pt. 1), and to the books on Mendelism by Bateson and Punnett respectively.

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* A lecture delivered in the Course for the Diploma in Ophthalmology in the University of Oxford, 1911.

In discussing hereditary affections, certain terms are now used which require mention. A "childship" is the collection of children of the same parentage, and each child is spoken of as a "sibling." Hereditary diseases may be inherited "directly" from parents; "indirectly" from grandparents; or "collaterally," when two or more siblings of a childship are affected. The latter is exemplified in familial diseases, such as amaurotic idiocy. "Anticipation" is the term applied to the tendency of a disease to manifest itself at an earlier age in successive siblings or in succeeding generations. "Anticipation" is sometimes illustrated in Leber's disease.

To state the principles of Mendelism briefly, we must first recognise that whereas a germ cell (or "gamete") is a single structure, an individual ("zygote") is a double structure compounded from two germ cells. A zygote formed from two gametes bearing the same character is spoken of as a "homozygote," and a zygote formed from two gametes of different character is spoken of as a "heterozygote."

If, then, we consider one attribute or character in an individual, say, pigment on the front of the iris, the presence of which gives a brown (hazel or green) eye, and the absence of which gives a blue (or clear grey) eye, we speak of the presence of pigment on the front of the iris as a "dominant" factor, *i.e.*, the factor which is predominant in the hybrid, and the absence of it as a "recessive" factor, *i.e.*, the factor which can separate out.

Now, taking this example, Mendel's rules may be summarized with the help of a diagram, representing the possible combinations of the two kinds of gametes in each parent, as follows:—

1. If a pure dominant (*e.g.*, an individual having inherited brown eyes from both parents) mates with another such, all the progeny will be pure dominants (homozygotes) and their germ cells (gametes) will all be dominant.

2. If a pure recessive (an individual with blue eyes) mates with another such, all the progeny will be pure recessives (homozygotes) and their gametes will all be recessive.

3. If a pure dominant mates with a pure recessive, the offspring will all be hybrids (heterozygotes), but presenting the dominant feature, *e.g.*, brown hazel or green eyes, and their gametes will be dominant and recessive in equal proportions.

4. If two hybrids mate, one quarter will be pure recessives (*e.g.*, blue eyes), one quarter will be pure dominants, and one-half will be hybrids, so that three-quarters will present the dominant feature.

5. If a pure dominant mates with a hybrid, half the offspring will be pure dominants, and half will be hybrids, so that all will present the dominant feature.

6. If a pure recessive mates with a hybrid, half the offspring will be pure recessives (*e.g.*, blue eyes), and half will be hybrids presenting the dominant feature (*e.g.*, brown eyes).

It will be noticed that both the pure dominants and the hybrids present the dominant feature, so that they can be distinguished only by cultivation or breeding which will show whether their gametes are in respect to the particular character, of only one kind, or of two kinds. The recessives being devoid of the dominant feature can be distinguished at once.

In man brachydactyly behaves as a dominant to the normal and illustrates Mendel's rules, so that recessive normals do not transmit it. Nettleship has shown by a pedigree extending through ten generations that night blindness can behave as a dominant, and that marriage with normals does not mitigate the condition in the offspring.

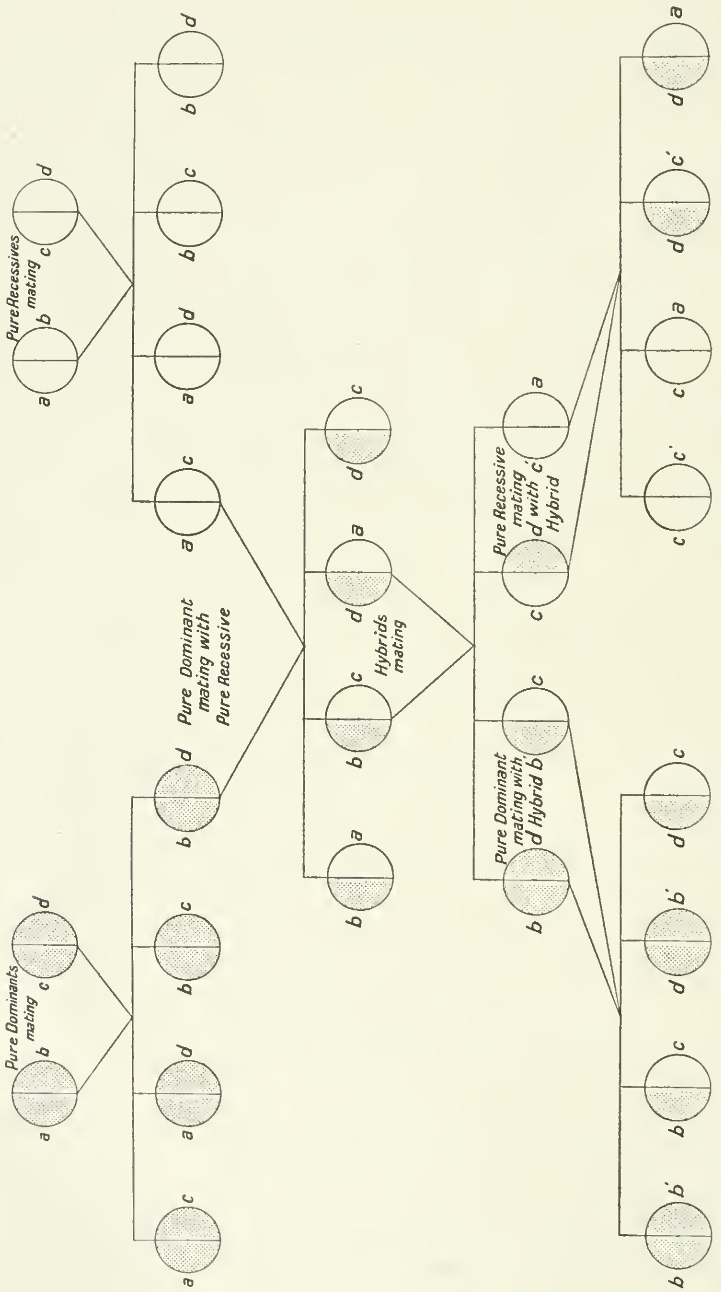
Pure Dominants mating
PureRecessives mating
Pure Dominant mating with Pure Recessive
Hybrids mating
Pure Dominant mating with d Hybrid b
Pure Recessive mating d with c Hybrid

DIAGRAM EXPLANATION OF MENDEL'S RULES.

Each circle represents an individual, or zygote; and each half, the germ cells, or gametes, forming the zygote, and which the individual will contain.
Grey=Dominant.
White=Recessive.
Pure dominant zygote=All grey.
Pure recessive zygote=All white.
Hybrid=Half grey and half white.
The gametes are lettered so that the four possible combinations in the progeny can be followed.

Leber's disease is an example of a so-called "sex limited" inheritance, and in that peculiarity it resembles colour blindness, the transmission being through apparently normal females, but usually affecting only males. In this form of inheritance it is supposed that females will not present the disease unless they are pure dominants or pure recessives as the case may be, *i.e.*, possessing the inherited tendency from both sides, or in other words "homozygous" for that particular factor. If they are impure dominants, *i.e.*, heterozygous, or only possessing one of the two inherited tendencies or factors, instead of both, then they will transmit the disease to their male offspring, but only carry it latent themselves. The disease being "dominant" for the male, if a female presents it all her male offspring will probably have it, since they will each inherit the dominant factor from the mother. A normal male, therefore, not being endowed with an inherited tendency, cannot transmit the condition, unless through an inheritance in the wife.

The Mendelian laws are seldom clearly and fully demonstrated in human beings, as the numbers in a childship are so comparatively few, the ascertained genealogical trees so short and imperfect, and the surrounding circumstances so uncertain. It is very different from the *data* which can be obtained and the inferences which can be drawn from well-planned botanical cultivation or animal breeding.

It has been suggested that men are, on the whole, more liable to inborn defects and diseases than women, and especially to those that affect the organs of special sense.

Nettleship (*Trans. Ophth. Society U.K.*, Vol. XXIX, ch. 12) from the analysis of his collected cases, comes to the following conclusions about Leber's disease :—

An affected male seldom transmits the disease.

An affected female has usually had normal parents.

An affected female transmits to her children of either sex in larger proportion than if she carried the liability latent, but some of her sons usually escape.

Early incidence seems to be associated with increased liability of the female sex, some females being usually affected when the incidence is before the fourteenth year, and rarely any when the onset is deferred until after thirty years.

Consanguinity is rare in Leber's disease, and the only risk from it is where an affected male marries a cousin who carries a latent liability, inherited either from her affected father or, through her mother, from an affected ancestor.

The **pathogenesis** of Leber's disease is obscure, but the predisposing cause must be an inherited neuropathic tendency, and we must suppose that the macular neurones have an inherited defect in their vital resistance or a defective metabolic energy.

The neuropathic tendency is shown by the relationship which appears to exist between Leber's disease and epilepsy (*e.g.*, Hancock, *Royal London Ophthalmic Hospital Reports*, Vol. XVII, p. 167); and an unstable biochemical state is evidenced by the high infant mortality occurring in some of the reported families, especially among the male children. Thus, Gould (*Ann. Ophth. and Otol.*, 1893), reported a family in which the disease appeared in six generations, the males being alone affected, and transmission being solely through the females. Of seven males and one female in a childship, four males died before they were a year old, and three males developed optic nerve atrophy at the ages of 23, 28, and 33 years respectively, the one female transmitting the tendency.

Again, Ogilvie (*Transactions Ophthalmological Society U.K.*, January, 1906) reported a childship in which there were two miscarriages and fourteen children, eight children died before sixteen months, and of three surviving males all became affected with optic nerve atrophy at the ages of 15, 22, and

25 years respectively. It is possible that some of those dying young would have inherited the tendency to the disease, and developed it later had they lived.

The exciting cause may be some toxæmic condition affecting the innately unstable macular ganglionic neurones. This toxæmia may be of endogenous origin and in some cases connected with the sexual functions, seeing that the disease is most common soon after puberty, and that exhaustion of the sexual organs from abuse or over-indulgence is liable to produce optic nerve derangement. There does not appear to be any association with syphilis.

In other cases the toxæmia may be of exogenous origin, *e.g.*, tobacco, and thus some of the reported cases of juvenile tobacco amblyopia may be accounted for, the ganglionic retinal nuerones being unduly sensitive to slightly toxic conditions.

Concerning the **pathology,** again, we cannot speak with certainty. In no case of typical Leber's disease, so far as I can discover, has there been a histological examination made of the retina and optic nerve during the attack.

The names "optic neuritis" and "optic atrophy" lead to the presumption that the disease is one of primary inflammation of the optic nerves succeeded by atrophy, the retinæ being unaffected.

In origin it has been regarded as retro-bulbar, showing itself ophthalmoscopically by descending changes arriving at the optic papilla.

It was supposed that there was a primary chronic interstitial neuritis limited to the fibres of the papillo-macular bundle—that is, to the bundle of axis cylinders, or "axones," which connect the ganglion cells of the macular area and region between it and the optic disc, to the lower visual centres. In a transverse section of the optic nerve behind the papilla this bundle occupies a wedge-shaped area in the lower and outer part, the apex of the wedge reaching to the central vessels, and the base lying against the pial sheath. Further back, the bundle becomes a vertical oval, and gradually attains the axis of the nerve in the optic foramen.

The position of the papillo-macular bundle in the nerve, and the distribution of fibres to the retina, is shown in the diagrams founded on Henschen's description (Norris and Oliver's *System of Diseases of the Eye*, Vol. II, pp. 241, 242). It was thought, as had been demonstrated in cases of central amblyopia from other causes, *e.g.*, diabetes (Nettleship and Edmunds, *Trans. Ophth. Society U.K.*, Vol. I, pp. 160), that the nerve fibres would be compressed and atrophied by the proliferation and subsequent cicatricial contraction of the connective tissue and fibrous septa surrounding them, and it was put forward that the papillo-macular bundle, having an abundant blood supply at the optic foramen by the fine capillary meshwork surrounding it, its fibres would be the most likely to suffer nutritional derangement from some toxic agent.

Other suggestions have been that some error of development of the sphenoid or malformation of the optic canal constricted the optic nerve; or that the condition was caused by a localised periostitis in the neighbourhood of the optic foramen; or a traumatism. The age, rapidity of onset, and definite course do not lend themselves to these theories.

Recent researches in neurology and on certain toxic amblyopias (Birch-Hirschfeld, Graefe's *Archiv f. Ophth.*, 1900), to which Leber's disease is comparable in its early clinical features, have shed a new light on the pathology of many cases of so-called retro-bulbar neuritis, and point to the primary lesion being in the retina.

It is now established that the nervous system is built up of a chain of nerve cells, or "neurones," which, by the help of their outgrowths, or "axons," become the conductors and distributors of nerve stimuli. The conduction is "intra-neuronic" where it passes along a neurone and its axon, and "inter-neuronic" where it passes from one neurone to the next in succession. It has been demonstrated that conduction is most likely to break down through morbid changes in the "perikaryon," as the nucleus-containing trophic centre of the neurone is termed; or, through separation of the "perikaryon" from its axon; or, at the synapse, or place where the termination of one neurone is in juxtaposition with the commencement of the next in succession.

The single stratum of large ganglion cells of the retina are the trophic centres ("perikaryia") of the optic nerve fibres, each of the optic nerve fibres being the proximally situated axis-cylinder-process, or axon, of one of these ganglion cells. Each ganglion cell also gives off a number of finer distal processes, or "dendrites," which interlacing, form synapses in the inner molecular layer of the retina with the dendrites of the terminal retinal neurones. Thus, the ganglion cells of the retina form with their dendrites distally, and their axis cylinder proximally, the second link in the chain of neurones connecting the retina to the brain. In this way the optic nerves and tracts are the equivalents of the intra-spinal tracts which connect the proximal terminations of the afferent cutaneous neurones with the cerebral centres.

In quinine amblyopia distinct changes have been found in the ganglion cells and nuclear layers of the retina by Nissl's method of staining the intra-cellular granules (Ward Holden and Birch-Hirschfeld); but in other toxic cases the changes, if any, have been too slight for demonstration. It has been shown, however, that nicotine acts selectively on the sympathetic ganglia and paralyses the synapses between the myelinated preganglionic fibres and the non-myelinated post-ganglionic fibres.

It may therefore be that in Leber's disease the primary lesion occurs either in the ganglion cells of the retina themselves, or in the synapses of the outer molecular layer between the dendrites of the ganglion cells and the terminal retinal neurones. In the latter case, the nutrition of the ganglionic neurones would be disturbed by the absence of normal connections distally. This would conform with Gudden's law, that one neurone may affect the nutrition of the next in succession, as is illustrated in the secondary atrophy of the neurones of the visual centres after division of the optic nerve. The reason for the macular neurones being specially affected can be explained by their later development and higher specialisation, each macular ganglion cell being connected with a single cone-bipolar distally and not with several, as in peripheral parts of the retina. This higher specialisation and perfection implies, as elsewhere, diminished resistance to noxious influences, so that the macular neurones are the first to be affected and the last to recover.

If it were proved that the primary pathological changes were in the retina, as seems probable by analogy with the toxic amblyopias, Leber's disease should be termed "hereditary central retinitis" rather than "hereditary axial neuritis." The degeneration and atrophy under these circumstances would be ascending and not descending.

To sum up, we must suppose that innately unstable macular ganglion cells suffer some nutritional disturbance, and that consequently degenerative and atrophic changes ascend by their axons or axis-cylinder processes to the optic nerve and produce breaking down of the myelin sheaths behind the lamina cribrosa and probably secondary interstitial changes, evidenced first by hyperæmia or slight inflammation of the papilla, and later by pallor.

The **typical clinical picture** of Leber's disease may be thus described.—A male, between the ages of 17 and 30, and usually about 20, discovers one day suddenly that there is a decided mistiness before objects which he is desirous of regarding directly and intently, whilst there is a relative clearness on viewing them indirectly by looking to one side. This it can be demonstrated is due to a central scotoma, either relative or absolute, for white and colours. The peripheral limits of the visual fields are usually unrestricted. The sight is generally thought to be better in a moderate or feeble light than in a strong light. The mistiness increases fairly rapidly during the next week or two until the sight is reduced to the reading of large print or merely to the counting of fingers. This failure of sight may or may not be preceded or followed by pains in the head and eyeballs.

The pupils are rather dilated and react to light somewhat sluggishly, although they contract well with convergence. In a strong light they contract, then oscillate, and, finally, assume the size they were before being subjected to the stronger illumination. On examining with the ophthalmoscope in uncomplicated cases, the media are found to be clear, and the only changes which may be detected are a certain amount of hyperæmia of the nasal half of the disc, with a contrasting ischemia or pallor of the temporal half, and an indefinite surrounding haziness of the retina, with some filling in of the vessel entrance, but no definite changes in the retinal vessels, and no hæmorrhages or patches of exudation. Later, the disc assumes an increased whiteness, and presents a certain amount of atrophic cupping, the retinal vessels becoming smaller, but without thickened coats.

It is important to remember, however, that the fundus changes are strikingly insignificant in the early stages as compared with the marked depreciation in sight.

Recovery is usually slow, and takes some six to twelve months or more, and the light sense, as tested with Bjerrum's grey types, is usually very imperfect, even after ordinary visual acuity is regained. The scotoma may clear from the very centre, and for white and red before green and blue, leaving a narrow ring scotoma for a further period.

Sometimes, the attack is of unequal severity on the two sides, or does not correspond in time. The age of incidence in women is about the same as in men, and the proportion of cases reported is about five males to one female.

In addition to the typical cases of Leber's disease conforming to the clinical picture just described, there are the following **atypical borderland varieties,** which resemble Leber's disease in being examples of a special family vulnerability of the optic nerves, but differ in that the damage extends beyond the macular neurones to the whole nerve, resulting in general atrophy.

1. Cases of family or hereditary congenital or infantile optic atrophy setting in either before birth or very early in life. In some cases the ophthalmoscopic changes are very slight. The cases are stationary. The patients see better in a dull light, and they have colour blindness. There are usually two or more in the same family (*Trans. Ophth. Society U.K.*, Vol. XVII: Swanzy and Snell).
2. Cases of peripherally contracted fields, associated with the central scotomata, and ensuing general optic nerve atrophy with permanent great loss of vision. Snell (*Trans. Ophth. Society U.K.*, Vol. XVII, p. 69) has described instances in two brothers and a cousin, and, again, in two brothers, all young men. Coincident symptoms were sleeplessness in one case, and sickness in another.
3. Cases in moderate smokers of the same family, both eyes being affected either simultaneously, or one before the other, and no improvement following the discontinuance of tobacco. The discs at first pink and then becoming white, with great permanent loss of sight, there being a central defect as well as a contracted field. Edgar A. Browne (*Trans. Ophth. Society U.K.*, Vol. VIII, p. 235) and Snell (*Ibidem*, Vol. XVII, p. 79) have reported such cases between the ages of 50 and 60 years. In these cases the tobacco appears

to be at most a precipitating or exciting cause in the presence of a family predisposition.

4. Some rare cases of serious and often permanent impairment of vision from optic nerve atrophy coming on in young men after matrimony or after long-continued sexual abuse (Snell: *Trans. Ophth. Society U.K.*, Vol. XVII, p. 78).

Under the title of "Complicated Infantile Familial Optic Atrophy," Behr (*Klin. Monatsbl. f. Augenheilkunde*, August, 1909) has described six male cases between the ages of three and thirteen, of whom two were brothers. In them complete or partial optic nerve atrophy was associated with mental impairment, exaggerated reflexes, ataxy, and urinary incontinence. Behr considers that they form a link between Leber's disease (which he calls "uncomplicated juvenile familial optic atrophy"), Friedreich's ataxy, Little's disease, and hereditary spastic paraplegia.

For a correct **diagnosis** of Leber's disease, besides careful attention to general history, signs, and symptoms, it is obviously important to obtain the whole family history in a suspected case. But this is sometimes impossible; hence the occurrence of apparently isolated cases.

Hanke has reported a case (Raymond and Koenig, *Recueil d'Ophtal*, mars, 1909), in which the family history had an important medico-legal bearing.—A workman, who had been exposed to sudden great variations of temperature at his work, became affected with what was diagnosed as ordinary retro-bulbar neuritis, and 60 per cent. of his wages was allowed as compensation, until the development of the same condition in a brother showed the true nature of the case.

Ordinary acute retro-bulbar neuritis is usually monocular; sometimes remarkably sudden (two or three days or less) in the onset of blindness; generally rapid (four to six weeks) in recovery; often associated with decided pupillary dilatation and sluggishness; and usually accompanied by local pain on ocular movements, and tenderness on pressure against the globe through the closed eyelids.

Toxic amblyopia (due to tobacco usually in this country) is gradual in onset; ceases to progress and soon recovers on removal of the cause; the patients are in later adult life; may be heavy smokers of strong tobacco; and have recently had some bodily or mental trouble.

There should ordinarily be no difficulty in distinguishing cases of optic nerve atrophy associated with disseminated sclerosis, general paralysis, tabes, or Friedreich's ataxy; or atrophy in association with a pituitary tumour. Nor should there be any difficulty about ordinary cases of post-neuritic atrophy.

The discovery of a lesion at the yellow spot will at once serve for the differentiation of cases where loss of central vision is due to obvious macular disease.

In all cases of Leber's disease light perception has been retained, and, although the duration of the disease is to be counted in months, a good recovery is not impossible or even very improbable. The sight, as a rule, remains stationary after the rather rapid initial onset, and improvement may be delayed for as long as one, two, or even three years. Hence, a hopeful and expectant attitude should be taken during that period

In the family reported by Hancock (*loco citato*), six had recovered out of twelve, and another was reported to be improving, and it is probable that in many cases which have been reported as permanently blind, recovery, although delayed, eventually took place, but was unrecorded, as they were not followed long enough.

Nettleship suggests that some of the cases of "astonishing cures of long standing blindness" may belong to this class.

The **prognosis** in regard to life seems unaffected by the incidence of Leber's disease.

It is doubtful if **treatment** has much or even any effect, but a prolonged rest and change should be advised. It is questionable whether moderate smoking is prejudicial in a typical case, but it would be wise to stop all possible toxic agents for the time, and so remove any element of doubt. Strychnine, arsenic, mercury, potassium iodide, nitrite of amyl inhalations, cupping to the temples, pilocarpine injections, and galvanism, are some of the various remedies which have been tried.

CLINICAL MEMORANDA.

A CASE OF VOLUNTARY NYSTAGMUS.

BY

R. H. Elliot, M.D. Lond., F.R.C.S. Eng.

MAJOR I.M.S.

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In the leisure of a board-ship passage out to India recently, a fellow passenger showed me a curious eye-trick, of which he seemed not a little proud. He is a chemical expert, with the degree of Ph.D. of Heidelberg, and it naturally follows that he is very highly educated, and a good observer; he is an active man of good physique and of exceptional powers of endurance; his age is 30; he has, according to his own statement, exceptionally keen distant and reading sight. I had no means of testing this by types, but he could pick up objects on the horizon quickly and well. He has never had headaches or any other signs of eye-strain; he has been able to produce nystagmus voluntarily as long as he can remember; to do so he stares straight in front of him, and within a second or two, the phenomenon begins. It is a binocular, horizontal, oscillatory movement; the amplitude is large and the movements are too rapid to count. There has never been a movement in any direction other than the horizontal; the oscillations cease as soon as, or very soon after, the voluntary effort is relaxed. When he wishes to produce the nystagmus, he is conscious of a sense of effort which he refers to the situation of the external recti muscles of both eyes. During the nystagmus, objects appear to be blurred in the sense that they are drawn out sideways; a feeling of tiredness, which is becoming more marked now, as he grows older, attends the production of the phenomenon. On several occasions of recent years he has noticed that the nystagmus has commenced spontaneously; this has occurred when he has been over-tired; he has been able to control it, almost at once, on such occasions. On the other hand, it is easier for him to produce the nystagmus when he is fresh than when he is tired.

I can only find the scantiest references in some of the larger text-books to the existence of the phenomenon of voluntary nystagmus, and I cannot remember to have met with a similar case previously. I therefore publish these notes, although they are necessarily scanty and somewhat unsatisfactory.

SOME UNUSUAL CASES OF NYSTAGMUS.

BY

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IN THE OPHTHALMOSCOPE of January 1, 1910 (page 15), I published a case of nystagmus of an unusual character. In it the involuntary movements took place only when the lids were closed.

The following cases may likewise merit publication :

1. Voluntary Nystagmus.

Mrs. J. D. L., age 24 years, came complaining of pain in and over the eyes. The refraction was as follows : R.V. = 6/12, H.M. 2·0 D. = 6/9 no cyl. L.V. = 6/60, H.M. 4·5 D. = 6/18 no cyl. The fundus was normal ; there never had been strabismus. There were 5° of latent convergence, and the right eye looked down 4°. But the interesting point in the case lay in the fact that, ever since childhood, she had been able at will to produce nystagmus. The ocular excursions were too rapid to count, almost as rapid as one can shake one's hand from side to side, horizontal, and perhaps about one mm. in length.

2. Nystagmus with Shaking Head.

Mr. V. T. B., age 76 years, wants glasses. His vision has always been poor. Under homatropine and cocaine : R.V. = > 6/60 c.—1·0 D. sph. = 6/60 L.V. = 6/36 c. — 0·75 D. sph. = 6/24 Right pupil does not act to light but does to accommodation and consensually. Left pupil is normal. Both discs are rather pale and waxy. No retinitis pigmentosa of the usual order ; some mottling around discs. On making patient look to one side and up, a lateral nystagmus is developed. On inquiry, it then appears that out of eleven children in the family, one brother and one sister had nystagmus. Their sight was "good," and they were not albinos. These two also developed a constant, quick jerking to and fro of the head, which they could stop at will. A daughter of the afflicted brother (she is now 68) has also nystagmus and a similar shaking of the head.

3 and 4. Almost Albinos, without Nystagmus, but with Poor Vision.

In the following two cases are associated a state verging upon albinism without nystagmus, but with a low acuity of vision :

Miss L. G., age 29, is nearly an albino, but her eyes are distinctly blue. Her brother is an albino with nystagmus. Her vision is as follows under homatropine and cocaine :—R.V.=6/36 c. $\frac{+0\cdot25\text{ D.sph.}}{+3\cdot0\text{ D.cyl. ax. }50^\circ}$ 6/18 (1/2). L.V.=6/60 c. $\frac{+0\cdot5\text{ D.sph.}}{+3\cdot0\text{ D.cyl. ax. }105^\circ}$ 6/12 (1/2). Two days later ordered cylinders V.=6/12 (1/2). The fundi were very pale.

Miss M. B., age 7 years, has always had poor sight. Her fundi contain no pigment. Had very pale hair as a baby, but her eyes were always blue. Under a mydriatic : R.V. = > 6/60, c.—7 D. sph. 6/60. L.V. = > 6/60, c. — 9 D.sph. 6/60.

5. Albinism with Permanent Foramen Ovale and Nystagmus.

The appearance of the following patient is remarkable, seeing that in her skin and mucous membranes are combined the colouring of an albino and that of the blood in one in whom the fœtal opening between the two sides of the heart has never closed. Slight nystagmus is also present, but is now much less marked than formerly. There is a little blue colour in the irides. R.V. = 6/60 c. + 6·0 D.sph. = 6/60. L.V. = 6/60, c. + 5·5 D.sph = 6/60. There is convergent concomitant strabismus.

A DERMOID GROWTH UPON THE CORNEA OF A DOG.

BY
T. HARRISON BUTLER, M.D. Oxon.
LEAMINGTON, ENGLAND.

With a Pathological Note

BY
A. C. HUDSON, F.R.C.S.
LONDON, ENGLAND.

IN THE OPHTHALMOSCOPE, Vol. VIII, No. 9, p. 638, Mr. Russ Wood described a case of a dermoid growth upon a dog's cornea, and showed a photograph of the growth, with a microphotograph of the histological section.

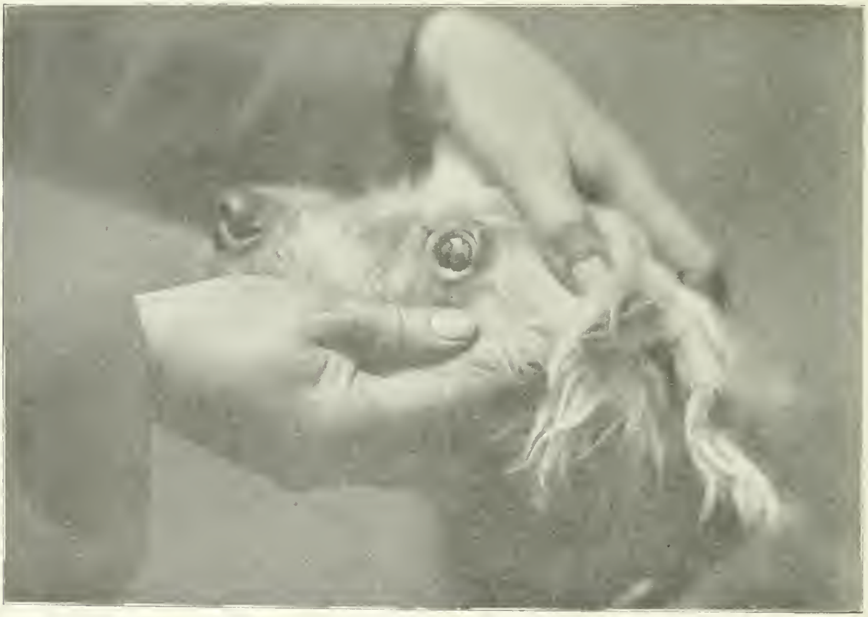

FIG. 1.

Mr. Wood drew attention to a case of a similar nature in a boy, described by Lang and Collins, and observed that there was in the Museum of the Royal College of Surgeons of England, a specimen of a dermoid growth in a sheep's eye with wool growing on it.

Some few weeks ago a well-bred Dandy Dinmont puppy was brought to me because it had a growth on its left eye, which the owner feared might prevent it winning prizes. I found on the outer aspect of the left eye a dermoid growth, about three-quarters of an inch long and half an inch wide (Figure 1). It was situated half upon the cornea and half upon the sclera.

The whole surface of the growth was thickly covered with hairs, about half of an inch long, which were the same brown colour as the dog's fur.

The growth was dissected off under 10 per cent. cocaine anæsthesia, and the conjunctiva sewn over the defect. Healing was uneventful, only a small leucoma marking the site of the growth. The dog stood perfectly still, and only showed his disapprobation of the proceedings by a few snorts.

Mr. A. C. Hudson kindly examined the growth and contributed the following report :

Pathological Report.

Tumour received from T. Harrison Butler, on 6th March, 1911. Tumour measures 9 mm. × 7·3 mm. superficially, and is about 2 mm. thick. Projecting from the surface are several long, thick, brown hairs. Microscopical sections show that the tissue has the structure of skin (Figure 2). The surface epithelium is stratified, with well-marked stratum granulosum, and cornified superficial layers ; the deepest cells are rich in brown pigment. Numerous irregularly formed hair follicles are present, and around them are grouped great numbers of sebaceous and sudoriparous glands, most of the former appearing as irregular tubular processes of the hair follicles. These structures are supported by a rather dense fibrous stroma, while the deepest parts of the tumour contain much fat, together with well-formed blood vessels.

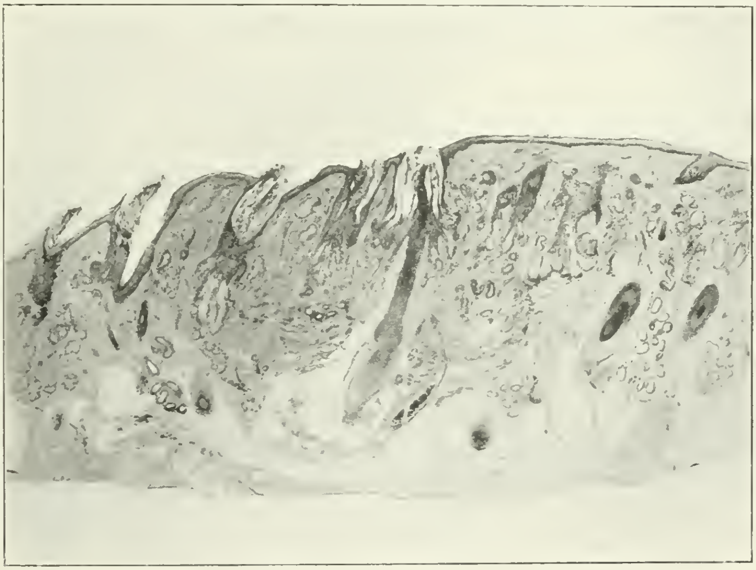

FIG. 2.

NOVELTIES.

AN EYELID RETRACTOR.

BY
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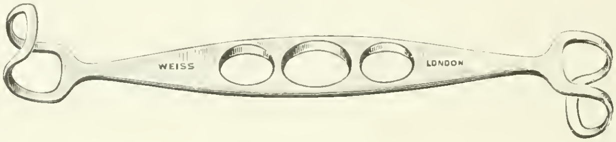
LONDON, ENGLAND.

Some ten years ago a handful of eye instruments of very antique pattern was given me.

Amongst them was an eyelid retractor for the efficiency of which I have always had a great admiration. The shape of its curved blade is such that it will lift an upper lid with perfect ease against the most annoying blepharospasm and that without the exertion of force.



The only defect of this old instrument is the length of the handle; shank and ivory measure together 5¾ inches.

Messrs. Weiss have made me a double-ended retractor; the larger blade is an exact copy of the old instrument, the other is a smaller size for use in children.

The blades are joined by a flat plate 2½ inches long which being perforated with holes, affords an easy grip; the pressure of one finger is sufficient to hold the plate against the patient's forehead, for the skin of the forehead and the pad of the surgeon's finger swell into the hole and effectually fix the retractor.

NOTES FROM SOME CONTINENTAL EYE CLINIQUES.

(*Second Article.*)

BY
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SUB-EDITOR OF "THE OPHTHALMOSCOPE."
GLASGOW, SCOTLAND.

II.—STRASSBURG.

The Augenklinik.—My time at Strassburg was extremely limited, so that I was unable to do more than note how Professor Hertel is coping with the difficulties caused by an old and inconvenient building. Of the wards, through which I was conducted by the Professor, I shall merely say that they were, of necessity, overcrowded, a condition with which we are only too well acquainted in our own country. The hospital contains sixty-eight beds. About 6,000 new patients attend annually. The number of beds to total new patients compares, therefore, favourably with our own hospitals. In Strassburg, eye accidents seem to be numerous.

Turning to the *out-patient* and *laboratory departments*, one finds that in spite of an inconvenient building, there is no lack of apparatus for clinical and pathological investigation. I was unfortunate enough to make my visit at a time when building alterations, designed to improve the hospital, were in progress, and instruments and appliances out of their usual places. As to the laboratory portion, there are separate rooms for section work, bacteriology, and experiments on animals. The last-named room is provided with a large operating table, to take a full-sized dog, and with sterilizers, and instruments. In the clinical portion there are separate rooms for examination of the patients and local treatment, for refraction, for perimetric work, etc., and also a dark room with photographic and other apparatus requiring artificial light. For the measurement of heterophoria, the Maddox apparatus is, as usual, the favourite. A neat device for the investigation of muscle balance at reading distance consists of a metal scale with a minute central hole in front of an electric lamp. A Maddox multiple rod on a handle is attached to the scale by a cord of correct length, so that the patient is always at the correct distance. I noticed also what I took to be the Worth type of squint measuring apparatus. The Sachs transilluminator is employed.

With regard to the *ophthalmoscopic dark room* in Strassburg, the arrangement is as follows.—The bays are screened off by specially deep partitions, so that each bay is practically a cubicle. At a convenient height, a shelf is fitted along each partition, and the patient sits between these two shelves. The examiner, who is provided with a movable lamp standing on the shelf, can move the lamp from one shelf to the other, and thus can use the indirect and direct methods with equal ease. This arrangement of shelves, or tables (see No. I, Freiburg), is a very convenient one in this respect, in that it enables the examiner to have a number of mirrors and lenses convenient to his hand, and visible to his eye, instead of being obliged to put them in his pocket or elsewhere out of reach and sight ; further, should he take off his own glasses, he is able to find them again without the expressed or suppressed observations which usually accompany the recovery of objects which are mislaid in an ophthalmoscopic dark room.

The *lecture hall* is large and well lit. At present there is no projection apparatus, but one is on order from Messrs. Zeiss. It is to be installed in a disused room, outside the lecture hall, and so fitted as to prevent all extraneous light reaching the latter.

The *operating room* has been recently brought up to date under the superintendence of the Professor. It is a particularly handsome apartment, and is provided with two separate operating tables, double sets of wash basins, and a complete electric installation. Hertel operates under all ordinary circumstances by daylight. The Volkmann and "Innenpol" magnets are employed.

The shortness of my visit to Strassburg prevented me from making any observations on *technique* or on therapeutic details.

My best thanks are due to Professor Hertel for so kindly showing me round at an hour which was very inconvenient for himself. Afterwards, I had the pleasure of listening to his clinical lecture for the day, and estimated that about 60 or 70 students were attending the course.

VIENNA, *December* 31*st*, 1911.

REVIEW.

THE FIELD OF VISION.*

(Concluded.)

BY

J. JAMESON EVANS, M.D., F.R.C.S.,
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FIELDS OF VISION IN CERTAIN CONSTITUTIONAL DISEASES.

Tabes.

Fuchs[1] has recently discussed the condition of the visual fields in tabes, and remarks on the comparative frequency and the early development of central scotoma. He considers Uhthoff's estimate of these cases, as forming 2 per cent. of all cases of tabetic atrophy, as being too low. He is also of opinion that they are not the result of a simultaneous syphilitic retrobulbar neuritis. In describing these cases, he states: "the central scotoma in tabetic atrophy is nearly always bilateral . . . . and but very few one-sided cases are on record. In the very beginning the scotoma is small, round, and actually central; at the same time the blind spot of Mariotte is found to be enlarged. Later on, the scotoma extends its limits mainly on the temporal side, so as to join finally the blind spot and assume the shape of a horizontal ellipse. At first, it is only the perception of colours, especially of red and green, which is abolished within the area of the scotoma. But if we examine carefully with small test objects and at a distance of one metre or more (Bjerrum's method) we do not fail to detect spots of absolute blindness within the colour-blind area. The blind spot of Mariotte is of course one of these, but besides there may be a blind spot just in the centre, or round it as a minute ring scotoma, which is rarely complete, but more often represented only by a blind arc concentric to the fixation point. Later on the scotoma not only becomes larger and larger but also more and more absolute, all perception of light being abolished within its limits." These central scotomata are often confined to the temporal half of the field, and may foreshadow the development of bitemporal hemianopia, which, although exceptional, is occasionally met with in tabes. Together with the formation of the scotoma, the periphery of the field becomes contracted. The colour fields are more contracted than those for white, and at a period when the latter are still tolerably wide, colour perception may be entirely lost. Farther on, the contraction, as a rule, becomes irregular. The boundary of the field shows a slight indentation on one side, and narrows down here more and more until it joins the central scotoma, usually pretty large in this advanced stage. If one eye is more advanced than the other, the first one, as a rule, presents a narrow and irregular field, while the field of the better eye is not only larger but also more regular. As contrasted with the scotoma of toxic amblyopia, in which the periphery of the field for white and colours remains normal, the tabetic cases show early loss of colour perception within the whole field, whose progressive contraction in general is indicative of their malignant character. Syphilitic retrobulbar neuritis differs from tabes in its being more amenable to treatment and in the later development of pallor of the optic disc.

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*For previous instalments of this Review, see THE OPHTHALMOSCOPE, October, November, December, 1911, and January, 1912.

Galezowski and Lobel[2] estimated that central scotoma is met with in 2 per cent. to 4 per cent. of cases of tabetic atrophy. They reported six cases, some of which they regarded as tabetic scotoma, while others were considered to be cases of toxic amblyopia (in one case due to aniline dye) occurring in tabetics.

Babinski and Chaillous[3] find that central scotoma is a very rare manifestation of tabes, and look upon such a symptom as probable evidence of intercurrent toxic retrobulbar neuritis. Sometimes, however, it is due to a sector defect involving the point of fixation, while a large part of the periphery of the field is still retained. Polack, in discussing this paper, related a case of tabes, in which the peripheral fields for white and colour were full, but there was a relative central scotoma for red, extending to the blind spot, and reduction of the light sense. Babinski and Chaillous find that in the great majority of cases of tabes the field for white is irregularly retracted and impairment of central vision keeps pace with limitation of the field. But they also describe cases in which concentric contraction was marked, whilst visual acuity was good, sometimes full, centrally.

Rönne[4] found that the fields in tabes often presented appearances like that of glaucoma, and showed a distinct tendency to be limited in the horizontal meridian (Fig. 3, THE OPHTHALMOSCOPE, November, 1911, p. 776).

Disseminated Sclerosis.

Hirsch[5] lays stress on the irregular atypical behaviour of the field in multiple sclerosis. "There is no homogeneous narrowing as in the case of tabes, but a most irregular constriction of the peripheral line. There may be a central scotoma or a combination of this with irregular narrowing of the field. In a few cases an annular-shaped scotoma has been found, and in other rare instances small parts of the periphery were alone preserved, while the function of all the rest of the nerve had been lost. Sometimes, there is a central scotoma only for colours or in some cases a general achromatopsia." It would appear that central scotoma, associated with acute retrobulbar neuritis, is often a precursory symptom of disseminated sclerosis which appears in about 30 to 40 per cent. of cases of acute retrobulbar neuritis after from one-third to seven years, according to Marx.[6]

Stölting[7] estimates the frequency at 20 per cent.

Kampherstein[8] found the following changes in the visual field in 37 cases of multiple sclerosis: central scotoma—absolute in five cases and relative in five cases; central scotoma with peripheral contraction of the field in three cases; green blindness in one case.

Epilepsy.

Rodiet, Pansier, and Cans[9] in their investigations on the state of the eyes of epileptics between the attacks, found that disturbances of the visual field may take the form of (1) retraction, (2) scotoma and ophthalmic migraine, (3) hemianopia.

Retraction of the field is irregular in form and often shows peripheral notchings, which are not generally symmetrical. The retraction is more marked immediately after an attack than it is some hours later and in the period preceding the attack. Thomsen and Oppenheim[10] recognise two forms of retracted fields in epilepsy—a permanent and a transitory form—the latter being a constant post-paroxysmal feature, the former apparently is found in cases in which the attacks are very frequent and presumably where atrophy of the optic nerve has set in. Charcot[11] has described retraction of the visual field as a form of epileptic aura. Parisotti[12] found vertical retraction in some epileptics with atrophy of the optic nerve, but concluded it had no diagnostic significance, as it is more frequent in hysterical than in epileptic cases.

Pichon[13] found retraction of the field in a third of the cases, and his conclusions as to the state of the visual fields of epileptics are as follows :—

1. In a third of the cases there is a slight concentric retraction of the field, more marked for red then for white and green ; and in a sixth of the cases the retraction is very pronounced, but is never as marked as in hysteria.
2. There is never inversion of the colour fields, as in hysteria.
3. There is never a central scotoma, but very often there are peripheral scotomata.
4. There is never hemianopia.
5. Irregularity is a constant feature.

Scotomata are more frequent in partial or hemiplegic epilepsy than in the general form. It is rare to find a scotoma, and when present, there may be some associated œdema of the papilla and retina. Scintillating scotoma and ophthalmic migraine in themselves are often regarded as first cousins to epilepsy, and they are frequently found associated with it.

The scotoma may assume the form of a central but gradually expanding blind area with scintillating zigzag borders ; this may be followed or replaced by a temporary hemianopia, either lateral or vertical, which is followed at a variable time within an hour by migraine headache.

Ophthalmic migraine in epileptics may appear at the same time as the epileptic attack or the migraine may precede the epilepsy, or ophthalmic migraine, partial epilepsy, or transitory paralysis may alternate as evidences of a common cause.

Hemianopia is probably only found in cases of symptomatic epilepsy, and according to Féré,[14] this is also more or less true of ophthalmic migraine.

Hereditary Optic Neuritis and Atrophy.

The name "scotomatous optic atrophy" is descriptive of this disease, as the large central scotoma, relative or absolute, for white and colours, and normal peripheral field are almost characteristic, if the failure of sight occurs somewhat suddenly about puberty or early adolescence. Raymond and Koenig[15] found that, in addition to these classical changes in the field, there was sometimes dyschromatopsia for green and occasionally for yellow. Various atypical forms have been recorded, and sector defects and concentric contractions have been noted in different members of the same family.

In the cases recorded by A. Knapp,[16] the first generation showed both central scotoma and peripheric contraction of the field, while in the second and the third generations no central scotoma had developed—the disease was manifested at the age of six years or earlier in these cases.

Hancock[17] made careful observations on a case of hereditary atrophy, which recovered, and found that the central scotoma cleared from the centre, resulting in a ring scotoma for white, and a relative central scotoma for green and blue but none for red. There was no enlargement of the blind spot. Three months later narrow crescentic areas above and below were all that remained of the ring scotomata and there was no relative central scotoma. Two other cases in this family recovered full vision, without any relative scotoma or enlargement of the blind spot, but with marked reduction of the light sense

Mügge[19] found a central scotoma associated with ring scotoma in one of his cases of Leber's disease. A hereditary or familial form of optic atrophy has been described by Behr[22], in which, in addition to diminished vision due to central scotomata, there is increased reflex irritability and slight spasm of the extremities, mild ataxia, unsteady gait, weakness of the bladder, and diminished intelligence. In some there was some peripheral contraction of the field. In all cases the disease became manifest in early childhood, and this, along with the general nervous symptoms, distinguishes it from Leber's hereditary optic atrophy.

Cranial Deformities.

Optic atrophy, whether from increased intracranial pressure (Uhthoff), or bony pressure of the optic ring, or of the carotid artery (Behr [21]), is the rule in oxycephaly, and this is associated with contraction of the visual fields. Changes in the sphenoid in the region of the optic canals have been suggested as the cause of Leber's disease, but as some cases recover, it is not likely that this view can be correct.

Functional Nervous Disorders.

Generally speaking, the characteristic feature of the visual field in *hysteria* is concentric contraction, but as von Reuss[22] points out, this contraction should be manifest at the very beginning of the test, and not be called into existence by fatigue during the examination. As a rule, the contraction for white and colours is proportionate, but the restriction may be limited to the colour fields alone. There is no extension of the fields when the patient's attention is stimulated.

v. Reuss[22] also considers that the oscillating field is a symptom of hysteria, and is usually associated with concentric contraction. In this condition the test object, white or coloured, disappears, and reappears several times in the same meridian, and careful examination will show ring scotomata or fragments of such. There may be a double ring scotoma, or the oscillating field may be associated with central scotoma, scintillating scotoma, or hemianopia. All scotomata in hysteria possess a certain degree of stability which distinguishes them from similar conditions seen in the exhaustion fields of neurasthenia. The size of the visual field should get larger the farther the patient is placed from the campimeter and test object, and this is apparently so in the majority of cases of hysterical contraction of the field. Greeff[23] and de Schweinitz,[24] however, hold that the hysterical field maintains the same size, no matter at what distance the point of fixation of the examined eye is placed—*i.e.*, that the field has a tubular character. The extent of the contraction does not seem to bear any very direct ratio to the degree of hysteria, although the contraction is generally marked in severe cases.

The contraction may be unilateral or bilateral, generally the latter. When associated with cutaneous anæsthesia, the restriction of the field is generally greater on the side of more extensive anæsthesia, and unilateral restriction usually appears on the hemianæsthetic side. The restriction may be transferred from one eye to the other by suggestion or irritation of the skin, or the field in the affected eye may increase in extent if the sound eye be kept open. Central scotoma and annular scotoma may be the most prominent features of the hysterical field, but it is more than likely that many cases diagnosed as hysterical central scotoma would, on further investigation, be found to depend on organic lesions, such as disseminated sclerosis or nasal sinus disease. The same remark applies to inversion of the colour fields, as proved by Bordley and Cushing.[25]

Inversion of the colour fields and particularly enlargement of the field for red were regarded by Parinaud[26] as important features of the hysterical field. On the other hand, cases have been frequently reported in which the field for red was remarkably diminished.

de Schweinitz[27] has recorded a case of hysterical hyperæsthesia in which there was an enlargement of the fields for all colours. He also found that the restriction may be confined to the colour fields only, while the white field remains unaffected. Hysterical hemianopia has been described by various observers, and Stephenson[28] has reported a case of hysterical bitemporal hemianopia in a boy, twelve years of age. de Schweinitz is, however, of opinion that "hemianopia as an *enduring* ocular symptom of hysteria, in the same sense as concentric contraction of the visual field, does not exist. On the other hand, it must be admitted that as a *temporary* phenomenon it has been observed a good many times by those who are competent to judge and has appeared either as a bitemporal defect, a homonymous lateral defect, or even, it would seem, as a binasal obscuration." Janet[29] has suggested that it is possible that there may be a period between complete hysterical amaurosis and its complete recovery, in which the field assumes a hemianopic form

Ré[30] has reported a case of hysteria in which the sight of the right eye was lost, but there was nasal hemianopia with inversion of the colour field in the left eye. It must not be forgotten that hysteria may occur without any change in fields of vision.

The fields in **Neurasthenia** are characterised by variability and instability, due to the easy exhaustion of the visual apparatus. von Reuss recognises five types of exhaustion fields :

1. The shifting displacement type of Förster, *i.e.*, the field when taken on a full arc perimeter is more restricted on the side of exit of the object Colour fields are similarly affected.

2. The exhaustion type of Wilbrand. If the field is recorded in the horizontal meridian only by carrying the test object from the temporal to the nasal side and back again from the nasal to the temporal side several times in succession, the points of the record will be found to get progressively nearer the centre.

3. Concentric contraction similar to that of hysteria but differing from the latter in that it is constantly changing and the colour fields are not so liable to be disturbed. Repeated examinations would give a series of concentric fields, or if taken in the horizontal meridian only, the exhaustion type of Wilbrand.

4. Exhaustion spirals, which may be close ("watch spring") or open ("snail shell"), according as the eye is less or more exhausted at the time of examination.

5. The recuperative extension type—a diminished field may extend after a period of rest or the extension may be due to a strong effort of will ("Negative Spirals" of Fuchs). These are best shown when the examination is made in a darkened room and the object is held a good distance off.

Wilbrand and König[31] have also observed oscillating fields and fatigue scotomas in neurasthenia, but von Reuss finds that these symptoms possess a certain degree of stability which distinguishes them from "exhaustion" phenomena and allows them to be classified under hysterical stigmata.

Traumatic Neurosis.

The alterations of the fields in cases of traumatic neurosis may be like those in hysteria or neurasthenia, but, as a rule, they show evidence of a mixture of both, *i.e.*, concentric limitation (hysteria) with exhaustion spirals (neurasthenia). In some cases the variations are such that after the field has been taken several times over, the lines are found to have crossed and recrossed, and to form a sort of interwoven wreath, which von Reuss[22] has designated the "crown of thorns" field. Contraction may not proceed after about one turn ("abortive spiral") or may proceed so quickly that the field rapidly gets to zero ("falling spiral.")

Wolffberg[32] argues that traumatic neurosis consists in an abnormal fatigue, not of the retina, but of the neuroptic apparatus, including its cerebral centres. The fatigue exists in the macula where it is shown by quantitative colour tests, but it is best demonstrated by the spiral contraction of the field for red.

According to Bartels[33], the symptoms discovered in a case of hysteria are largely dependent on the mental attitude of the surgeon. He who expects to find concentric contraction of the field will find it, and *vice versâ*. The mere size of the field, in his opinion, has no diagnostic value, but the fact that the investigator can cause it to vary in size by suggestion is characteristic of hysteria.

This view, however, seems contrary to the experience of a large number of ophthalmologists and neurologists who must be considered as thoroughly qualified to express trustworthy opinions on such cases.

Diabetes Insipidus.

Redslob[34] has drawn attention to the not inconsiderable number of cases published in which diabetes insipidus, whether resulting from intracranial neoplasm (generally syphilitic) or fracture of the base of the skull, was associated with bitemporal hemianopia. In the case described by Redslob, there was probably a chiasmal injury, but in other traumatic cases and in cases of neoplasm the lesion has not been defined. Possibly, it may be related to the hypophysis.

Loss of Blood and Anæmia.

Bleeding under ordinary surgical circumstances is not, as a rule, followed by any ocular complication, but when the result of a pathological lesion, it is not an uncommon experience to find atrophy of the optic nerve and defective vision with limitation of the visual field. This is particularly the case when the hæmorrhage proceeds from the gastro-intestinal tract or the uterus. Short of permanent amaurosis, we may find amblyopia, with contraction of the field to within 15° or 20° of the fixation point, as in the case of optic atrophy following extraction of a tooth, recorded by Stirling.[35]

In a case of hæmatemesis recorded by the reviewer,[36] the optic atrophy and contracted retinal vessels were associated with loss of practically the whole of the lower half of both fields and marked contraction of the upper fields. In another similar case seen later, the lower half of the right field was lost, and the whole of the left field was lost with the exception of a small arciform area extending from the 10° to the 30° circles in the upper temporal quadrant.

A somewhat similar field was noted in the right eye by Moore[37] in a case of optic atrophy, the result of uterine hæmorrhage, but the left field showed irregular and somewhat concentric contraction. In another case, due to bleeding piles, described by Moore, there was pallor of the disc without contraction of the vessels, and the changes in the field consisted in a central scotoma of about 10°, relative in the left eye, absolute in the right eye, with about 10° peripheral contraction in each eye. Carlini[38] observed a sector defect of the lower left field for each eye after severe hæmorrhage from the radial artery, and concluded that the lesion was a cortical œdema.

Hawthorne[39] has observed hemianopia in the course of anæmia, and ascribes the defect to a limited cerebral thrombosis. He also regards retrobulbar neuritis as a possible result of thrombosis in anæmia. F. Richardson Cross[40] has reported a case of retrobulbar neuritis dependent on anæmia. In this case there was a positive central scotoma for white and contraction of the field for red.

Concentric contraction is the usual modification in the fields in cases of acute papillœdema associated with chlorosis, such as those reported by the reviewer[41]. In the more profound blood dyscrasias various modifications of the fields may be met with as a result of hæmorrhages into the retina or optic nerve substance or sheath.

Pregnancy.

Forti[42] investigated the fields of vision in pregnant women, who were otherwise normal, to test the conclusions of Bellinzona and Tridondani, which were as follows :—

1. That a bilateral limitation of the fields does occur in pregnancy.
2. That the left eye is generally more severely affected than the right.
3. That this restriction consists not in a uniform or concentric contraction, but in a bitemporal pseudo-hemianopsia, a limitation of the fields in the temporal areas.
4. That these alterations are more evident in primiparæ than in multiparæ, and that they progress as pregnancy proceeds.
5. That there is no tendency to dyschromatopsia or achromatopsia.
6. That the accuracy of vision is not in any way interfered with.

Forti's conclusions under similar circumstances were :—

1. That there is a very slight limitation of the nasal field and a decidedly more definite restriction of the temporal.
2. That the eyes are equally affected.
3. That the alteration is more marked in primiparæ, but is not adversely affected by the advance of pregnancy.

He does not confirm his predecessor's views with regard to the colour fields, as he found that they were constantly and irregularly altered, their boundaries crossing one another, the limits for some colours extending beyond those for white.

He agrees with Bellinzona and Tridondani that these changes are of a functional nature and the fact that these observers found the left eye more affected than the right he ascribes to the fact that the right eye was probably examined first and consequently the left eye was in a state of " fatigue " when examined.

It must be evident, however, that the changes in the fields in pregnancy are not those generally associated with the hysterical state, and in view of the bitemporal restrictions and interlacing of the colour fields it should be enquired whether or not they are related to changes in the pituitary gland, as hypertrophy of the hypophysis is known to take place during pregnancy.

Hemianopsia has also been recorded by Woods[43], and, in the opinion of Bull, it was of thrombotic origin in these cases.

REFERENCES.

1. **Fuchs, E.**—*Archiv. of Ophthalmology*, September, 1911.
2. **Galezowski, J., and Lobel, A.**—*Recueil d'Ophtalmologie*, avril, 1906.
3. **Babinski and Chaillous, J.**—*Recueil d'Ophtalmologie*, 1907, p 89.
4. **Rönne, H.** *Loc. cit.*
5. **Hirsch, W.**—In Posey and Spiller's *The Eye and Nervous System.*
6. **Marx.**—*Archiv f. Augenheilk.*, Dezember, 1907.
7. **Stölting.**—*Klin. Monatsbl. f. Augenheilk.*, Juli, 1909.
8. **Kampherstein.**—*Arch. of Ophthalmol.*, May, 1909.

9. **Rodiet, Pansier, and Caus.**—*Recueil d'Ophtalmologie*, mars, avril, 1908.
10. **Thomsen and Oppenheim.**—*Archiv. de Psychiatrie*, 1884.
11. **Charcot.** *Tribune Médicale*, 1898.
12. **Parisotti.**—*Bull. de l'Académie de Rome*, janvier, 1892.
13. **Pichon.** *L'Encephale*, 1888, p. 139.
14. **Féré, Ch.**—*Revue de Médecine*, 1880.
15. **Raymond and Koenig, Ed.**—*Recueil d'Ophtalmologie*, mars, 1909.
16. **Knapp, Arnold.** *Archives of Ophthalmology*, July, 1904.
17. **Hancock, W J.** *Royal Lond. Ophth Hosp. Reports*, Vol XVII, p. 169.
18. **Behr, C.**—*Klin. Monatsbl. f. Augenheilk.*, 1909, S. 138.
19. **Mügge, F.** *Zeitschr. f. Augenheilk*, März, 1911.
20. **Uhthoff, W**—*Bericht der Ophthalmolog. Gesellschaft*, Heidelberg, 1910.
21. **Behr.**—*Bericht der Ophthalmolog. Gesellschaft*, Heidelberg, 1910.
22. **v. Reuss, A. R.**—"Das Gesichtfeld bei functionellen Nervenleiden." Franz Deuticke, Leipzig and Vienna. 1902.
23. **Greeff, R.** *Berlin. klin. Wochenschr.*, 26 Mai, 1902.
24. **de Schweinitz, G. E.**—In Posey and Spiller's *The Eye and the Nervous System.*
25. **Bordley and Cushing.**—*Vide supra.*
26. **Parinaud.**—*System of Diseases of the Eye*, edited by Norris and Oliver, Vol. IV.
27. **de Schweinitz.**—*Loc. cit*
28. **Stephenson, S.**—The Ophthalmoscope, May, 1909.
29. **Janet.**—*La Presse Médicale*, 1899
30. **Ré, F.**—*Archivo di Ottalmolog*, aprile, 1911.
31. **Wilbrand and König.**—Quoted by de Schweinitz Posey and Spiller *loc. cit.*
32. **Wolffberg, L.**—*Archives of Ophthalmology*, 1904.
33. **Bartels, Martin.**—*Zeitschr. f. Augenheilk.*, November, Dezember, 1907.
34. **Redslob.**—*Klin. Monatsbl. f. Augenheilkunde*, Februar, 1905.
35. **Stirling, I. W.**—*Ophthalmic Review*, August, 1904.
36. **Evans, J. Jameson.**—*Birmingham Medical Review*, September, 1899.
37. **Moore, R. Foster.**—*Trans. Ophthal. Soc. U.K*, Fasc. 1, 1911.
38. **Carlini, V.**—*La Clinica Oculistia*, febbraio, 1906.
39. **Hawthorne, C. O.**—*Lancet*, September 19th, 1908.
40. **Cross. F. Richardson.** *Bristol Medico-Chirurg. Journal*, March, 1911.
41. **Evans, J. Jameson.**—*Lancet*, October, 1904.
42. **Forti, N.**—*Archiv. di Ottalmolog.*, Vol. XVII, p. 8, 1910. *Ophth. Review*, 1910, p. 240.
43. **Woods, H.** *Trans. Sec. Ophth. A.M.A.*, 1908.

[THE END.]

TRANSLATION.

3.—GUIDE TO THE MICROSCOPIC EXAMINATION OF THE EYE.

(*Continued*)

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Imbedding Processes.

There are two methods of imbedding, each of which has its advantages and disadvantages: 1. Imbedding in celloidin (or photoxylin); 2. Imbedding in paraffin.

For various reasons the celloidin method is preferred for the eye. Sections, so large as those of an entire human bulb, can hardly be cut in paraffin. Further, the appearances characteristic of many pathological changes are destroyed by the high temperature involved in the paraffin process. On the other hand, when paraffin is used, much thinner sections can be obtained, and it is easier to get these in series. Paraffin is therefore employed for small pieces of delicate tissue.

1. The Celloidin Process.

The pieces of the eyeball must be thoroughly dehydrated before they can be imbedded in celloidin. Herein lies the secret of good imbedding. If this is properly performed, better results are obtained with the simplest cutting apparatus than with the most complicated and expensive microtome when the imbedding is defective. A sharp knife is also essential.

Dehydration is carried out in absolute alcohol. This, however, takes up water from the atmosphere, and after a time loses in concentration. To get over this difficulty, *Exsiccators* have been devised. Of these there are various forms, but the simplest and most convenient is, in the opinion of the author, constructed as follows.—A wide glass vessel, provided with a ground-glass stopper, is taken, and in it there is placed a wire support on which the tissue to be dehydrated rests. A layer of roasted copper sulphate is spread on the floor of the vessel, so as to form a layer under the alcohol. Any water present in the alcohol sinks, owing to its higher specific gravity, and unites with the powder which has a great affinity for it. Thus, the tissue, which lies in the upper layers of the alcohol, escapes contact with the water. The copper sulphate when exhausted becomes green in colour, and must then be dried and roasted afresh.

The eyeball remains in the exsiccator for 24-28 hours, and is then divided into pieces suitable for imbedding. During the process it is exposed to the air and is touched with moist hands, and, consequently, after being divided, it must be replaced for one day in the exsiccator. The pieces are then taken up with forceps and transferred to a thin solution of celloidin.

Celloidin is manufactured by Schering, of Berlin, and sold in the form of soft semi-transparent tablets or shavings. It is advisable to cut up the whole tablet into small pieces, while it is still soft. These pieces are dried in the incubator, till they assume an amber colour. They can then be preserved in a wide-necked bottle with a well-fitting cork. A tablet weighs 40 grammes. Thin celloidin is prepared by adding to 10 grammes of dried celloidin 120 ccm. of ether and 120 ccm. of absolute alcohol. For thick celloidin we take 60 ccm. of ether, 60 ccm. of absolute alcohol and 10 grammes of celloidin. The celloidin is dropped into the solvents. The bottle should be well shaken and laid on its side, to prevent the celloidin from sticking to the bottom; after a few hours, the bottle should be shaken again and laid on its other side. An excellent plan for securing a pure solution is to place the celloidin chips in a muslin bag, and to suspend this in the centre of the solvent, where its contents dissolve most readily. Any foreign matter in the celloidin (*e.g.*, when celloidin is used for a second time) is retained in the bag.

It is of the utmost importance that the celloidin solution should be free from water; therefore we must take care that the alcohol and ether employed as solvents contain none. Ordinary ether frequently contains as much as 10 per cent. of water. This must be extracted by means of roasted copper sulphate, or by the addition of anhydrous phosphoric acid.

Wintersteiner's method is as follows.—The tissue to be hardened rests on a small glass ring which is supported by three glass legs. This support is placed in a wide-necked preparation jar provided with a ground glass stopper, and capable of holding 30 ccm. The bottom of the jar is covered with roasted copper sulphate over which the absolute alcohol is poured. If the pieces of tissue are so small that they would fall through the ring, which was primarily intended to carry the half of the eyeball, the ring may be covered with a piece of filter paper.

After being hardened, the pieces remain for 1-10 days (according to their size) in a mixture of equal proportions of absolute alcohol and ether; then for 8-14 days in thin celloidin; and for a similar period in thick celloidin. The ether should be allowed to evaporate very slowly in a well-covered vessel, until the celloidin attains the consistence of soft wax. A preparation of some size is therefore left in the celloidin solutions for a month.

PHOTOXYLIN.—This new substance is used for imbedding in exactly the same manner as celloidin. It occurs in commerce in the form of wool, which, being very explosive, is scheduled under the Dynamite Act. It can be obtained also in the form of a syrup.

It possesses certain advantages over celloidin: (1) it dissolves immediately; (2) it is more transparent, so that the preparation is better seen when mounted; (3) it is less deeply stained by hæmatoxylin.

Since the wool takes up water from the air, it must be dried for a time in the incubator. It dissolves readily in a mixture of alcohol and ether, and should be added to this gradually, until the solution is of the desired consistence. A thin and a thick solution are prepared, as in the case of celloidin.

The pieces of the eyeball remain four days or longer in thin celloidin, and for the same time in thick celloidin.

Now they are ready to be mounted.

PREPARATION OF THE CELLOIDIN BLOCK.

The tissue having been saturated with celloidin must be set upon a firm support. Wood is unsuitable, as it contains colouring matter which finds its way into the preparation and has a deleterious influence on the nuclear and diffuse stains. Nor is cork to be recommended, since it contains an acid which is injurious to the tissues. It is better to employ "Stabilit," a material which may be procured from the electrical *depôts*. It can be trimmed to the proper shape with a saw. There are two methods of procedure:—

1. A strip of paper is fastened round the piece of "Stabilit" by means of thin celloidin, thus forming a small box. The upper edge of the paper should be a little higher than the surface of the specimen when this is in position. Some thick celloidin is then poured into the receptacle, so as to close all chinks and to form a viscous layer on the floor. The preparation having been placed in the box by means of a lifter, adjusted suitably for cutting, and pressed firmly into the layer on the floor, the receptacle is completely filled with thick celloidin. The ether must now be allowed to evaporate until the celloidin attains the consistence of soft wax. If this takes place quickly, the surface of the mass becomes hard and evaporation from the deeper parts is hindered. The ether should consequently be allowed to evaporate slowly. This is effected by "partial covering," the preparation being placed under a bell-glass slightly raised at one side from the table on which it rests by means of the handle of a teasing needle. As soon as the celloidin has attained the requisite consistence, which may be judged by finding if it no longer takes on the impress of the finger point, the block is transferred to 70 per cent. alcohol.

The evaporating stage lasts from four to twelve hours, the time required depending on the quantity and thickness of the celloidin and on the extent to which air is admitted. In the alcohol the celloidin becomes milky and attains the consistence suitable for cutting. After a few hours the paper is removed and the superfluous celloidin cut off. Henceforth the preparation must not be allowed to dry, but must be preserved in 70 per cent. alcohol.

2. The tissue is placed in a shallow vessel and thick celloidin is poured over it. The vessel is partially covered, and the ether allowed to evaporate very slowly, the process lasting, if necessary, even for several days. The more gradual the evaporation, the finer the preparation. In Greeff's laboratory the evaporating process sometimes lasts from two to three weeks. The vessel containing the specimen must not be disturbed till the celloidin is firm, or air bubbles may be produced. As soon as the celloidin has attained the consistence of soft wax, the tissue is cut out and placed on a piece of "Stabilit" which has been smeared with thick celloidin. The joint is allowed to harden in the air for about five minutes, and the block is then transferred to 70 per cent. alcohol. Sections may be made after a few days.

On Cutting Celloidin Sections.

Preparations imbedded in celloidin are cut with the microtome. The knife should be tightly screwed to its carriage. Whereas in cutting paraffin sections the blade is placed at right angles to the tissue, in cutting celloidin sections it should be adjusted obliquely, so as to pass with its whole length through the block. The more perfect the imbedding, the more obliquely should the knife be set. The object must be firmly secured in the holder of the microtome, and levelled so that its surface lies in the plane of the knife, and all the screws must be tight. After each section is cut, the knife and the tissue are moistened with a brush dipped in 70 or 80 per cent. alcohol. The sections should, in fact, swim on to the knife. They are preserved till stained in 70 or 80 per cent. alcohol.

Wintersteiner recommends that the sections be cut under alcohol, but places each section as it is removed from the knife in a large staining dish containing water. Here it swims about, and becomes perfectly flat. In this way curling and wrinkling of the section are avoided during the subsequent processes.

The thickness of the sections depends on their size, but in no case should this exceed 25μ, even when complete or distended myopic eyeballs are being cut.

Staining.

Hardened preparations require to be stained. Stains are selected which affect the different elements of a cell in a different degree, and render one element more prominent than the rest. The oldest and still the most important stains are those which exhibit a special affinity for the nuclei of all cells present in the section. Hence their name—*nuclear stains*. Of these hæmatoxylin and carmine are the chief. The nucleus having been stained, the protoplasm can, if desired, be brought into relief by means of another, the so-called *contrast stain*. Stains which have a diffuse action are selected for the latter purpose. Since the nuclear stains are mostly employed in the form of aqueous solutions, the sections are immersed in water for a short time before being placed in them. If, however, alcoholic staining solutions be employed, this is unnecessary. After being removed from the staining solution, the sections are washed thoroughly in water to get rid of any superfluous colouring matter. (See "Nuclear Stains and Double Stains.")

Having been stained and washed, the section is then cleared, and mounted on a slide. It must, however, be thoroughly dehydrated before being treated with the clearing agents, as these are not miscible with water.

Dehydration.

Dehydration is carried out by means of alcohol. Since the section is apt to become wrinked when transferred directly from water into strong alcohol, it should first be immersed in weaker spirit, 80 to 90 per cent. It is next placed upon the slide by means of the section lifter, and dried with blotting-paper. Alcohol, 96 per cent., is then poured over it. It would be preferable to employ absolute alcohol, but this is inadmissible, because it would dissolve the celloidin which holds the parts of the section together.

Clearing in Oil.

The section is now saturated with an essential oil which clears it. Thereafter it is carefully examined to determine whether it is perfectly transparent. If any water is left, owing to incomplete dehydration, it separates in the form of microscopic drops, which appear like white clouds to the naked eye. Should this occur, the section must be treated with 96 per cent. alcohol once more.

Clove Oil may not be used, since it dissolves celloidin.

Oil of Turpentine possesses the same disadvantage.

Admissible are :—

Oleum Origani Cretici, and

Oil of Bergmot.—This last is the least sensitive to water.

Cedar Oil should be reserved for use with the oil-immersion lens.

All oils are more or less injurious to the staining ; the sections, therefore, should be left in them for only a short time, and the oil should be dried off by means of blotting-paper.

The best substitute for the oils is *Xylol.* It, however, is very sensitive to water, and requires thorough dehydration of the section. If the celloidin is to be retained, the dehydration is carried out in 96 per cent. alcohol, and, since xylol does not clear from this grade, the section is first treated with *Carbol-Xylol.* This consists of :—

Pure carbolic acid crystals	1
Xylol	3

It acts rapidly.

Carbol-Xylol should not be used for sections in which bacteria may be found, since carbolic acid removes the anilin dyes. Such sections should be thoroughly dehydrated, and treated in pure xylol or cedar oil.

After being cleared, the section is covered with a drop of Canada balsam, and protected with a cover-glass.

Recapitulation.

The following is a synopsis of the various stages in the preparation of the stained celloidin section :—

1. Fixing, *e.g.*, in Müller's fluid, 6 weeks.
2. Washing in running water, 1 day.

3. Completion of the hardening process in alcohol :—

Alcohol, 70 per cent., 1 day.
,, 80 ,, ,,
,, 90 ,, ,,
,, 96 ,, ,,
,, absolute (exsiccator), 2 days.

4. Division of the bulb.
5. Exsiccator, 1 day.
6. Thin celloidin, 4 days.
7. Thick ,, 4 ,,
8. Mounting on the block ; partial covering ; slow evaporation.
9. Alcohol, 70-80 per cent., 6 hours or longer.
10. Section cutting with the microtome under 70 per cent. alcohol.
11. Water, 1 minute.
12. Staining (hæmatoxylin, carmine, etc.).
13. Washing in water.
14. Alcohol, 80 per cent., in a staining dish.
15. Drying with blotting paper, on the slide.
16. Alcohol, 96 per cent.
17. Carbol-xylol. } or oil.
18. Xylol. }
19. Canada balsam.

Serial Celloidin Sections.

1. To *Weigert* belongs the credit of describing a method whereby serial sections can be obtained from material imbedded in celloidin. This method has been modified to advantage by *Obregia* (*Neurol. Centralbl.*, 1890, No. 18).

Several strips of toilet paper, slightly broader than the width of the sections, are procured. A flat plate is placed near the microtome, and covered with a thick layer of blotting paper moistened with 80 per cent. alcohol. The paper strips are arranged on the blotting paper, glossy side upwards. Each section, as it is cut, is removed from the knife, on which it lies in spirit, by applying one of the strips of paper to the section and drawing it to the left along the blade. The next section is taken up on the same strip to the right of the last, and so on, till the sections extend the length of the slide to be used. While each section is being cut, the strip of paper is laid on the moist plate, the side with the sections being uppermost. In this way a series of strips is prepared and arranged in order on the plate.

Obregia employs two solutions :—

Solution A.

Solution of sugar candy in distilled water, of syrupy consistence (difficult to make)	30
Alcohol, 90 per cent.	10
Syrupy solution of dextrin	10

This mixture is poured over a sheet of glass of suitable size, so as to form a thin film, just as if a photographic plate were being prepared. The film is allowed to dry in the air for about half an hour. The strips carrying the sections are then pressed upon the surface of the film to which they adhere, and the paper is removed. Several strips can be so applied.

There is now poured over the sections, so as to form a uniformly thin layer :

Solution B.

Photoxylin	6
Absolute alcohol	100
Ether	100

This is allowed to settle, and the clear liquid is decanted.

The sheet is placed in a horizontal position, and exposed to the air till the milky appearance around the sections disappears. It is then immersed in water, where the sugar dissolves and the photoxylin film becomes detached. The film can be stained as desired. After this the film is cut into suitable pieces, and mounted in Canada balsam under large cover-glasses or sheets of mica.

2. The simplest, and for most purposes the most convenient, method of obtaining serial sections in celloidin is as follows.—A large circle of blotting paper is placed on a plate, and moistened in the manner just described. The upper margin of the circle is marked (1). Commencing from the mark the strips bearing the sections are arranged on the blotting-paper in the form of a spiral. They may be numbered, although this is unnecessary. When the circle is complete, the paper is transferred to a flat vessel provided with a closely fitting lid. The floor of the vessel is covered with weak alcohol sufficient to keep the blotting-paper moist without, however, allowing the sections to float. A second spiral is similarly prepared, numbered (2), and placed above the first, and so on till the process is completed. The sections are thus arranged in order, and can be stained when convenient.

When this method is adopted it is not compulsory to finish the work at one sitting, and, moreover, every section need not be examined. It is often sufficient to take every fourth or sixth section, and thus to gain a general idea of the object. Afterwards sections can be inserted at any place where this is necessary.

The sections are stained singly in vessels placed in a row. Leber has devised a plate with circular depressions, after the style of an egg-tray, which is very convenient for arranging and staining serial sections, and which can hold as many as 300 of these. (*Bericht der Heidelberger Oph. Gesellsch.*, 1892).

Large sections, such as sections of the complete eyeball, may be removed from the knife on separate pieces of blotting paper, and placed one above the other in a tall vessel. The papers can be numbered if this is desired. The subsequent procedure is as detailed above.

Wintersteiner recommends the following simple apparatus, when serial sections have to be made of large objects imbedded in celloidin.—A glass plate is placed in a stout wooden frame 26 cm. long and 22 cm. broad. The box so formed serves to hold 30 glass dishes with overlapping lids. The dishes are 4 cm. in diameter, and have a capacity of 10 c.cm. Both dishes and lids are numbered (1 to 30), the pigment being burnt in so that it resists all reagents.

Before use the lids are removed, and the dishes are filled with 60 per cent. alcohol. The sections are lifted from the knife by means of a large soft brush, and placed in the dishes according to their number. When each dish contains a section we begin again with the first, and so on. There is no risk of confusing the sections in any one dish, since, after thirty sections have been made, their macroscopic appearance and outline differ so greatly that they are readily recognised. Of course this applies only to objects like the eye.

If the tissue has been stained in bulk, so that the sections are ready to be placed on the slide, we may examine every fifth section to obtain a rough idea of the series. We take numbers 1, 6, 11, etc., or numbers 5, 10, 15, etc. Of course, in order to avoid confusion, the sections from each dish must be treated separately in the clearing fluid, and the slides carrying the mounted specimens must be numbered.

If the sections are unstained, the covers of the dishes, which, as has been mentioned, are also numbered, serve to contain the staining fluid. Here, again, we examine every fifth section, in order to determine which part of the series is of importance, and to learn if another staining method is more suitable.

Since the dishes are of considerable capacity, it is not necessary to hurry on with the work. Moreover, before the sections of the first series are mounted, those of a second series, provided they are readily distinguishable, may be distributed among the vessels.

Since the dishes and the bottom of the frame are transparent, this apparatus allows us to select the colour of our background to suit the transparency of the sections. We choose a dark ground for unstained pale sections, and a white one for coloured or pigmented tissues. This advantage is lost if white porcelain dishes are used, as has been suggested by Leber and others. Additional advantages of this apparatus consist in the larger quantity of fluid which the dishes contain, in the ease with which they can be removed from the frame, and in the prevention of evaporation owing to the well-fitting lids. The apparatus can be procured from Dümler, 25 Mariahilferstrasse, Vienna. It costs about fifteen shillings.

(*To be continued.*)

CURRENT LITERATURE.

NOTE.—Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—REMEDIES.

(SECOND NOTICE.)

(1) **Cords, R.**—On the cause of adrenalin mydriasis. (Zur Beurteilung der Adrenalinmydriasis.) *Zeitschrift für Augenheilkunde*, April, 1911.

(2) **de Waele, Henri.**—On the treatment of nicotine amblyopia by lecithin. (Sur la médication de l'amblyopie nicotinique par la lécithine.) *Archives d'Ophtalmologie*, mai, 1911.

(3) **Ruhemann, J.**—On a chemical method of obviating dazzling of the eyes. (Ueber die auf chemischen Wege zu ermöglichende Beseitigung der Blendung der Augen.) *Berliner klin. Wochenschrift*, July 3rd, 1911.

(4) **Rhoads, J. N.**—Mydriatic ozena. *Ophthalmology*, July, 1911.

(5) **Wyler, Jesse S.**—Recurring corneal erosions. *Ophthalmology*, July, 1911.

(6) **Heiberg, K. A. and Grönholm, V.**—Histological researches on the action of Finsen light and of "expression" combined with sulphate of copper in trachoma. (Histologische Untersuchungen über die Einwirkung des Finsenlichtes und der Expression nebst Blausteinbehandlung beim Trachom.) von Graefe's *Archiv f. Ophthalmologie*, 26 September, 1911.

(7) **Grönholm, V.**—Finsen treatment in trachoma. (Finsen Therapie bei Trachom.) von Graefe's *Archiv f. Ophthalmologie*, 26 September, 1911.

(8) **Treber, Hans.**—Silver acetate in ophthalmia neonatorum. *Wien. klin. Rundschau*, Nos. 35 and 36, 1911, ref. in *British Medical Journal*, December 23rd, 1911 (375).

(9) **Castresana.**—Serotherapy in suppurative keratitis. (La sueroterapia en las queratitis supurativas.) *Archivos de Oftal. Hisp.-Amer.*, Octubre, 1911.

(10) **Valude.**—Ocular and auditory troubles following the use of hectine. (Troubles oculaires et auditifs consécutifs à l'emploi de l'hectine.) *Ann. d'Oculistique*, octobre, 1911.

(11) **Kleczkowski T.**—The presence of adrenalin in the blood serum in glaucoma. (Das Vorhandensein von Adrenalin in Blutserum der Glaucomkranken.) *Klin. Monatsbl. f. Augenheilk.*, Oktober, 1911.

(12) **Gilbert, D.**—On the effect of venesection according to Dyes in glaucoma. (Ueber die Wirkung des Dyes-schen Aderlasses bei Glaucom.) von Graefe's *Archiv f. Ophthalmologie*, 7 November, 1911.

(13) **Mende, Roman von.** — The local application of iothion in ophthalmology. (Ueber die lokale Anwendung des Jothion in der Augenheilkunde.) *Klin. Monatsbl. f. Augenheilk.*, November, 1911.

(14) **Capauner, Ismar.**—Treatment of cavernous angioma of the lid by carbon dioxide snow. (Behandlung der Lidkavernome mittelst Kohlensäureschnee.) *Klin. Monatsbl. f. Augenheilk.*, November, 1911.

(15) **Dolganoff, W.**—The action of "Salvarsan" in eye diseases. *Berl. klin. Wochenschrift*, November 6th, 1911; translation in *American Journal of Ophthalmology*, December, 1911.

(16) **Ryerson, G. Sterling.**—On the use of radium in ophthalmology. *Canadian Medical Association Journal*, December, 1911.

(17) **Wilson, J. Alexander.**—Oedema of the eyelids treated by buried strands of silk. *British Medical Journal*, January 6th, 1912.

(18) **Hosford, J. Stroud, and James, G. Brooksbank.**—Observations upon the treatment of gonorrhœal conjunctivitis in the adult. *Lancet*, January 13th, 1912.

(1) It is well known that the instillation of a 1:1000 solution of adrenalin does not alter the size of the pupil of a normal individual. Loewi, however, stated in 1907 that it acted as a mydriatic in certain maladies, chief among which were diabetes mellitus and Graves' disease. Loewi's observations have received some confirmation. Wessley, however, pointed out that even in the normal individual, a strong solution of adrenalin dropped into the eye would cause mydriasis, or a weaker solution if administered by subconjunctional injection.

Cords, of Bonn, believes that in all cases where Loewi's reaction is present, the cornea is unduly permeable, and thereby allows the drug to reach the iris in greater concentration. He has made experiments upon rabbits. He shaved off part of the thickness of the cornea of one eye, and dropped adrenalin into both eyes. The eye which had been modified showed a mydriasis, the other did not. He insists that in every case in which the reaction is obtained, the cornea should be examined with the greatest care.

T. HARRISON BUTLER.

(2) Working on the Meyer-Overton theory as to the absorption of alkaloids by the lipoids of the brain, and on the experiments by Nerking as to their neutralisation by injection of lecithin, **de Waele**, of Gand, has applied the principles to the treatment of tobacco amblyopia in four cases, two of which he details. In the first R. V. = fingers at 3 metres, L. V. = fingers at 1·5 metres; no colour perception. Treatment consisted of the daily subcutaneous injection of 10 centigrammes of lecithin. After eleven days, there was perception of colour, after twenty-four days, R.V. = 6/9, L.V. = 6/36; and after thirty-five days, R.V. = 6/6, L.V. = 6/9. In the second case, R.V. = 6/5, L.V. = 6/6, there was a small central scotoma for red and green in the left eye. After seven days of treatment, R.V. = 6/3, L.V. = 6/4, and no colour scotomata. The method has also been successful in a case of atropine poisoning, and in one of papillary neuritis due to a microbic toxin. The author considers the treatment to be rational and in no way dangerous.

BERNARD CRIDLAND.

(3) As a means of protecting the eyes from ultra-violet rays, Hammer, in 1891, recommended the use of quinine bisulphate, and in 1909, C. Mannich reported to the German Pharmaceutical Society the discovery of a series of bodies, which, like æsculin, possessed the power of absorbing such rays of between 400μ and 300μ.

Ruhemann, a *Sanitätsrat* of Wilmersdorf, a suburb of Berlin, has employed for this purpose a soluble monoxide derivative of æsculin, neutralized with boric acid.* As an 0·3 per cent. to 0·5 per cent. solution, this liquid is known in commeree as "Aqua Zeozoni" (to be obtained from Kopp and Joseph, 122, Potzdammer Str., Berlin). When dropped into the eyes, three times a day. even for prolonged periods, it causes no irritation, does not stain the parts, and improves cases of photophobia. By its use the coloured glasses, veils, and umbrellas commonly employed to modify strong light, are rendered superfluous. Its local use is suggested by Ruhemann in a variety of conditions—as, for example, conjunctivitis, iritis, incipient cataract, and in measles. It can also be used prophylactically in snow blindness, in sea dazzling, in electric ophthalmia, and in glass-blowers' cataract.

SYDNEY STEPHENSON.

(4) **Rhoads** has noticed in patients, after instillation of cocaine or homatropine for the estimation of refraction, a fœtid odour, like that of ozœna, where there was no odour before the application. He states that the odour passes off with the effects of the mydriatic.

A. J. BALLANTYNE.

(5) The treatment recommended by **Wyler** for this stubborn affection is that the denuded area should be rubbed with a cotton wool probe soaked with a saturated solution of chlorine (strong chlorine water). This is followed up by the use of atropine, xeroform ointment, and a bandage. The application may have to be repeated, but the results are good.

A. J. BALLANTYNE.

(6) **Heiberg**, of Copenhagen, and **Grönholm**, of Helsingfors, examined particles of the trachomatous conjunctiva snipped off first before and then at various periods after the application of light treatment, and compared them with similar particles when "expression" of the follicles and the sulphate of copper stick had been used. They find that Finsen rays have a specific action upon the cellular formations, destroying only the pathological cells, without

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* For reference to the use of this substance see THE OPHTHALMOSCOPE, 1911, p. 807.

touching the connective tissue. A very short application seems sufficient. They think that light treatment is far superior to any of the older methods.
R. GRUBER.

(7) The method adopted by **Grönholm**, of Helsingfors, for the application of light treatment is in its essentials identical with that of Lundsgaard, who used it in tuberculosis of the conjunctiva. It requires a great deal of experience and special knowledge in the operator and in two assistants. It is also painful and somewhat protracted, as not more than one square centimetre can be treated at one time, although, as not more than five or ten minutes' application is required, in suitable cases several portions can be treated at one sitting. The author speaks highly of the efficacy of his method. The local reaction is always very strong. The lids and conjunctiva are often extremely œdematous for a week, and the mucous membrane is covered by a greyish pseudo-membrane, which, if removed, soon re-forms. Gradually, the swelling subsides and leaves the mucous membrane pale, glossy, and sometimes silvery and scarred; the scars are superficial and thin, rarely star-like, as after spontaneous formation; the shrinking is not more marked than after the usual treatment. Sometimes one sitting suffices, but in other cases it must be repeated two, three, or even—rarely—six times. By expressing the follicles first, some time can be saved. Grönholm's results are.—*Primary results*—81 per cent. cured, but even in uncured cases, considerable improvement was generally obtained. *Final results* (12-17 months after cessation of treatment) 60 per cent. remained cured. The frequency of recurrence is, of course, unpleasant, but does not seem any commoner than after the older treatment. Generally speaking, cases where the fornix alone was involved were the most favourable, while cases with extensive shrinking were most liable to recurrence, but granular and papillary forms did not show any marked difference. Unfortunately, the new treatment is not free from the danger of corneal complications, which are most likely to occur where the cornea was previously diseased, but sometimes appear in other cases as well. They caused considerable impairment of vision in three cases. This shows the importance of very cautious and gradual procedure in case of pannus or ulceration of the cornea. Finsen treatment can, of course, be combined with other forms of local treatment. Grönholm also describes in his paper an ingenious arrangement for measuring the area of conjunctiva and determining the degree of its shrinking. He introduces a small flattened and curved probe, which shows a millimeter gauge, under the upper lid right into the fornix while the patient looks strongly downwards. After noting the figure, the lid is lifted until the upper corneal margin becomes visible, and the corresponding figure on the gauge is read again. The sum of both these figures gives, of course, the whole extent of the corneal sac for the upper lid. The value for the lower lid is similarly ascertained. The average figure is 40 mm. for the upper and 30 mm. for the lower lid. The lowest value to allow for the closing of the eyelids in sleep and free movement is 20 mm. on the upper and 10 mm. on the lower lid, figures which ought to be taken into consideration in resorting to certain operations, especially excision of the fornix and of the conjunctiva tarsalis after Kuhnt. R. GRUBER.

(8) **Hans Treber** reviews the results of the prophylactic use of silver nitrate for ophthalmia neonatorum, and recommends the adoption of prophylactic treatment as a routine measure in private practice as well as in hospital practice. He does not, however, deny the possibility of setting up the so-called "silver catarrh" if a solution stronger than 2 per cent. of silver nitrate is employed, and admits that when a solution is kept for some time evaporation

may lead to concentration to a greater strength of silver nitrate, enough to set up irritation when brought into use. In order to avoid this danger, silver acetate, as recommended by Zweifel (1900), is to be preferred to silver nitrate. At a temperature 14° (58° F.) silver acetate is only soluble to the amount of 1.02 per cent., and therefore too strong a solution is impossible. Its action is as prompt and certain as that of silver nitrate, and according to some authors, is even better. Thus, Thies, in each of 2,000 infants, had 1 per cent. silver acetate solution dropped into one eye and 2 per cent. silver nitrate solution into the other. Five of the children developed ophthalmia, but in two of the cases the inflammation attacked the silver nitrate eye and not the other. To test the value of Credé's prophylactic method, as carried out with either silver nitrate or the acetate, the author has made a study of the statistics of institutions for the blind and of the cases which have come under his own care. The diminution in the number of cases in which gonorrhœa was the cause of blindness was well marked in the case of the Royal Institute for the Blind in Munich; from an average of 42·9 per cent. in the years from 1876 to 1892, when Credé's method would not have been employed for any of the cases, to an average of 25·4 per cent. in the last seventeen years, when the method would have been somewhat widely employed—that is, a fall of 16·4 per cent. The author also reports on the results of treatment in 426 births at the School for Midwives in Munich. In 14 cases, 3 per cent. of the whole, the mothers suffered from a muco-purulent vaginal discharge, but none of the children in these cases developed ophthalmia. In 7 other cases, where there was no suspicion of disease of the mother, there was a purulent eye affection in the child, but only one of these was gonococcal in character—that is, 0·2 per cent. Even this case might evidently have been avoided, and was probably due to some defect on the part of the nurse, since the inflammation affected one eye only. The article concludes with a strong recommendation for the use of the prophylactic treatment in every case, the best solution to employ being one of silver acetate.

(9) **Castresana** treated hypopyon-keratitis by means of sera. He used at first pneumococcic serum, thinking that the presence of the pneumococcus in so many of these lesions pointed out the appropriate line of treatment; he found that cases treated thus, did little, if at all, better than those treated by the old methods. He then tried anti-diphtheritic serum, and obtained much better results. He concludes that it is much more active than other sera, whether given by injection or by the mouth. HAROLD GRIMSDALE.

(10) **Valude**, of Paris, records the points of ophthalmic interest in a case previously reported by Gilbert Ballet and Hischmann in the *Presse Médicale* for September, 1911.—The patient, a man, aged 74 years, had been under treatment by Ballet for tabes from 1898. In 1910, without Ballet's knowledge, he had a course of injections of hectine, commencing with 2 of 10 centigrammes followed by 8 of 20 centigrammes. The smaller dose was well borne, but the larger caused temporary defect of hearing and vision. On January 12th, 1911, the eyes were examined by Valude, who found V.=R. and L. 2/3 (which he regarded as normal for the patient's age), and the eyes normal in appearance, apart from slight opalescence of the lenses and senile peripapillary sclerosis. On May 26th Ballet commenced a series of 10 injections of 20 centigrammes each of hectine on alternate days. After the third injection, the patient complained of depression, and after the fifth, he said he could neither see nor hear. On June 12th Valude saw him, and found his vision reduced to 1/3, with extreme contraction of the fields. Under treatment with strychnine and electricity, the hearing became as good as before the injections, but the vision gradually failed altogether. Up to the

end of August there were no ophthalmoscopic changes, but on October 5th there were definite signs of optic atrophy.

Valude considers that it would be wiser to avoid using hectine in cases in which the optic and auditory nerves are not quite healthy, and in any case not to give injections of more than 10 centigrammes. He suggests that possibly the disastrous result of the treatment may have been due to some spontaneous change in the drug. R. J. COULTER.

(11) **Kleczkowski**, of Krakau, employed, for the detection of adrenalin in the blood serum, the biological test of Ehrmann (dilatation of the pupil of the excised eye of the frog) and the chemical tests of Comessati and Zangfrognini (colour reactions with perchloride of mercury, and permanganate of potash). Thirteen cases were investigated—nine of inflammatory, three of simple, and one of hæmorrhagic glaucoma. In every case he was able to detect the presence of adrenalin in the blood serum by both biological and chemical reactions. What part does the adrenalin play in causing the glaucoma? The presence of adrenalin in amounts which can be detected by these tests is associated with the occurrence of abnormally high blood-pressure. This would lead to increased transudation from the ciliary vessels, and so to rise of intraocular pressure. But if the conditions are otherwise normal, this rise of intraocular pressure must be only temporary. Again, the circulating adrenalin will affect the whole sympathetic nervous system, leading to, among other effects, dilatation of the pupil. This impedes the escape of intraocular fluid, and helps to give permanency to the elevation of tension. The degree of this pupillary reaction will depend, of course, on the amount of adrenalin in the circulating blood, and on the sensibility of the dilator muscle. We have still to account for the facts that adrenalin may be present in the blood, raising the blood pressure but causing no glaucomatous symptoms, and that glaucoma may occur in one eye but not in the other. The occurrence or non-occurrence of glaucoma is dependent on local conditions, such as sclerosis of the ocular tissues, and especially of the ocular vessels.

A. J. BALLANTYNE.

(12) Although Kraemer could not, as a rule, find any direct connection between abnormal blood pressure and glaucoma, his results seem to be disproved by Wessely's experimental researches and by the clinical results from Eversbusch's clinics (Erlangen and afterwards Munich), as reported in this paper. The venesection which was generally used was the one advocated by Dyes. It consists in withdrawal of a small quantity of blood only (3 grams to each kilogram of the patient's weight), followed by diaphoresis. Decrease of intraocular tension, as measured with Schiötz's tonometer, as well as of blood-pressure, was always present. In inflammatory glaucoma, this result occurs much later, *viz.*, during the following day only, and lasts longer, up to the third or fourth day. In glaucoma simplex the maximum of depression of intraocular tension appears mostly after 6-8 hours, and lasts until the next day.

Gilbert, of Munich, strongly advocates the therapeutical use of venesection in glaucoma. During the prodromal stage, it should be combined with myotics and careful general treatment. In established glaucoma, treatment should consist in venesection, followed by operation. The interval between the two should be 6-24 hours in glaucoma simplex and 24-48 hours in glaucoma inflammatorium. R. GRUBER.

(13) Reuth has used iothion externally with good results in swelling of the lacrymal gland. Lauber found that 15 - 30 per cent. solutions of iothion in oil could be instilled into the conjunctival sac without producing much irritation. **Roman von Mende**, of Mitau, has employed it in trachoma.

Corneal massage with 1 per cent. iothion vaseline caused less irritation than 1 per cent. yellow oxide of mercury, and produced marked diminution of trachomatous pannus, which had resisted other forms of treatment for months. It also seemed to exercise a favourable influence on the conjunctival condition. With the same ointment, he has obtained good results in the treatment of the opacities following corneal ulcers. A. J. BALLANTYNE.

(14) **Capauner,** of Mühlhausen (Alsace), gives details of two cases (one in a boy of five months, and the other in a girl three months old) in which a cavernous angioma of considerable size was successfully removed by the application of carbon dioxide snow. In the first case the six applications were spread over a period of twelve months, the treatment having to be interrupted for various reasons, but in the second case applications were made regularly every fourteen days, until the tumour had entirely disappeared, leaving only a slight thickening of tissue in the affected region. The *technique* is described in detail. The first applications were of thirty seconds duration, but the later ones caused less reaction and were increased to one minute. No scars were formed. A. J. BALLANYTNE.

(15) Even now, perhaps, the time is not ripe, as **Dolganoff**, of St Petersburg, remarks, to assign to "Salvarsan" its rightful place in the arsenal of therapeutic remedies.

Does "Salvarsan" act as a poison on the eye?—As regards patients with healthy eyes subjected to the new remedy, not one of the three hundred observed by the author showed any departure from the normal that could be attributed to the drug, although with few exceptions they were examined one or two months after the injection. Dolganoff's conclusion is that "Salvarsan," employed in ordinary doses, does not act as a poison on the eye, as do some other organic compounds of arsenic, as atoxyl. Even where the remedy appeared to be contra-indicated on accouut of some pathological condition of the optic discs, its administration did no harm. This important observation, although based (as the author admits) upon a few cases only, appears to prove the possibility of trying the remedy even when some atrophy of the optic nerves is already present.

What forms of eye disease are likely to be benefited by Salvarsan?—Dolganoff has employed the remedy in (*a*) atrophy of the optic disc (seven cases), (*b*) degeneration of the ocular muscles (twelve cases), (*c*) inflammation of the optic discs (seven cases), and (*d*) inflammation of the iris and ciliary body (five cases).

In the *a* group of cases (optic atrophy) Dolganoff obtained, upon the whole, a tolerably favourable result, since, in general, the progress of the condition was retarded, and in one case, indeed, a slight improvement in sight was produced. "It is clear," writes the author, "that arsenobenzol has no deleterious or hastening effect on the degeneration and blindness." In the *b* group of cases (degeneration of the ocular muscles) good results were obtained in recent paralyses, inasmuch as three of five such paralyses disappeared rapidly after the injection of "Salvarsan." On the other hand, seven cases which had lasted for upwards of one year, remained without change, irrespective of their origin, whether syphilitic or tabetic. In the *c* group of cases (syphilitic optic neuritis) "Salvarsan" had no magic effect. In brief, some of the cases did well and others badly. A study of the cases points the moral that arsenobenzol is in some instances a wonderful ally of mercury, but as it is impossible to recognize the cases beforehand, both remedies should be used conjointly. Group *d* (inflammation of iris and ciliary body) showed the value of arseno-benzol in syphilis of the anterior part of the vascular system of the eye. It exerted a definite curative effect upon this class of case, particularly, as it would seem, when accompanied by infiltration.

"Salvarsan" was also successfully employed by Dolganoff in subretinal hæmorrhage of syphilitic origin. The patient also suffered from paralysis of one oculo-motor nerve and from basal meningitis. But the action of "Salvarsan" was somewhat obscured by the simultaneous employment of mercury, iodide, and diaphoresis.

To sum up, then, "Salvarsan" was found by Dolganoff to be efficacious in iritis, irido-cyclitis, recent oculo-motor paralysis, and descending optic neuritis. It yielded doubtful results in choked disc and in certain cases of ascending neuritis. Lastly, it is useless in vitreous opacities, and in long-standing mydriasis and myosis. Relapses were not uncommon after its employment. One point brought out by the author is very important practically, namely, that so far as Dolganoff's experience goes, "Salvarsan" has no untoward effect on the state of a diseased eye, even when optic atrophy is present. At the same time "Salvarsan" is by no matter of means a specific preparation capable of radically curing syphilitic affections of the eye or of other parts of the body. On occasion, better results may be obtained from it than from mercury, and, contrariwise, on other occasions, like mercury, it is completely useless. SYDNEY STEPHENSON.

(16) **Ryerson**, of Toronto, gives an excellent *résumé* of the work so far accomplished with radium in the treatment of diseases of the eye, preceded by some account of its physiological action. As to the last-named, the following conclusions have been reached.—"The radium rays produce a visual sensation which is probably a fluorescence of the refractive media and possibly of the retina itself. On the other hand, it is in part due to the direct irritation of the cortical visual centre, producing an increase of visual power. In consequence of their material nature (being composed of particles) and of their irrefragibility, it is not possible for the radium rays to form an image on the retina". In Ryerson's opinion, "naked" radium should never be applied to the eye, except in cases of epithelioma. Under all other circumstances its rays should be filtered through lead, tin, or aluminium. The apparatus containing the radium bromide should be held in contact with the part for ten or fifteen minutes, and the application may be repeated daily. Radium has been successfully employed in rodent ulcers, angiomata, sarcomata, and epitheliomata of the eyelids. The same remark applies also to trachoma, spring catarrh, and lupus of the conjunctiva. Its use in iritis and uveitis is mentioned. The author alludes to the successful employment of radium in corneal ulcers by Lawson and Davidson, and he has himself successfully treated three such cases. Ryerson suggests, finally, that radium should be tried in opacities of the lens or of the vitreous. SYDNEY STEPHENSON.

(17) **J. Alexander Wilson**, of Glasgow, treated a case of chronic œdema of the eyelids, which had followed erysipelas, by W. Sampson Handley's plan, namely, the insertion into the affected tissues of sterile silk threads, intended to act as so many artificial lymphatic vessels. The ends of the threads were cut off, and the wounds were closed with collodion. For a week there was little improvement, but some nine months after the operation, the eyelids had regained almost their normal appearance. SYDNEY STEPHENSON.

(18) **Hosford** and **James**, of London, have been fortunate enough to employ the following method of treatment in cases of adult gonorrhœal conjunctivitis "with the most uniformly gratifying results."—Rest in bed; low diet with the administration of aspirin (gr. x *t.d.*), and quinine (grs. ij *t.d.*), and of mercury and saline purgatives; and the constant use of a warm douche, at first of a solution of potassium permanganate (1 : 15,000 to 1 : 20,000), and

later of boric acid (1 in 60). The fluid, which should trickle uninterruptedly over the inflamed eye, may be applied either in the usual way by a douche-can and rubber tube or else by relays of attendants. There must be no cessation of the flow either by day or by night. The constant douching must be kept up for seven or eight days, and the authors lay stress upon the danger of premature cessation. For the first few days of the disease few attempts, and those of the most cautious character, should be made to inspect the eye. Insomnia may be counteracted by the administration of veronal (grs. viii) at night. Hosford and James have not seen a "definite ulcer" of the cornea under the method of treatment they describe, but they omit to state how many cases they have treated. After the tenth day, when discharge has mostly ceased, they treat any remaining chemosis by painting the conjunctiva of the lower lid with silver nitrate (grs. 2 to the ounce) or by the use of zinc permanganate drops (gr. 1/8 to the ounce). They animadvert upon "the almost uniformly pernicious influence of the caustics and astringents applied in the early stages of the disease," under which designation they include silver nitrate, protargol, argyrol, and mercury perchloride.

SYDNEY STEPHENSON.

II.—THE EXCLUSION OF TRACHOMA FROM AMERICA.

Danis, Marcel.—The sanitary inspection of immigrants in the United States of America from the point of view of trachoma. (L'inspection sanitaire des immigrants aux États-Unis d'Amérique au point de vue du trachome.) *La Clinique*, 5 août, 1911.

Danis, of Brussels, who was once medical officer on a Red Star liner, gives an interesting description of the steps taken to exclude trachomatous immigrants from the United States of America.

On arriving at Antwerp, whence the Red Star boats sail for America, the immigrants, who for the most part are Russian Jews, Russians, Poles, or Magyars, are placed for several days in depots ("hotels" they are politely called in the communication) under the control of the steamship company and the *surveillance* of the Emigration Commission. Three or four hours before the boat sails, the immigrants are inspected medically, especially with reference to the eyes, the scalp, and the general state. Those who are deemed "undesirable" are either treated for their particular malady or else returned to the place whence they came. That the examination is not altogether a farce may be gathered from the fact that when Danis undertook the voyage 25 passengers out of 678 were refused.

During the passage, the immigrants are inspected twice a day by the ship's doctor. Twenty-four hours before arrival at New York, a much more elaborate personal inspection is carried out, and an identity sheet is filled up for each passenger. Special attention is paid to the condition of the eyes. On arrival at the quarantine, the immigrants file before the medical officer attached to the station, who tallies their number with the number of identity sheets placed in his hands. Passengers found to be suffering from contagious disease are detained at the quarantine.

On arrival at New York, immigrants are transferred by ferry boat to Ellis Island, an island of some eleven acres in New York harbour, which has hospital and other accommodation fitted for their reception. Each newcomer is examined by three medical men, of whom one looks after the general condition, another examines the hairy scalp, and the third everts the eyelids and searches for trachoma, etc. The least sign of trachoma, even follicular conjunctivitis, or the tiniest trace of an old trachoma-scar is sufficient to cause an immigrant to be placed apart from others, and to be subjected to fresh medical examinations. Incurables and undoubtedly diseased individuals are sent back, at the expense of the steamship company, by the boat which brought them to the golden land. In cases where disease should obviously have been detected before embarkation in Europe, the company responsible is fined one hundred dollars. At the same time, if the diagnosis of trachoma be not formally made until after the lapse of forty-eight hours, this penalty is not exacted. Doubtful or curable cases of trachoma are hospitalized on Ellis Island at the expense of the steamboat company. They are set at liberty after cure; but if the condition be chronic and rebellious, they may still be returned to Europe.

The author notes as a curious point that a woman of more than fifty years is regarded as senile, and entrance into America is for her prohibited if she be alone or not attended. The same rule applies to pregnant women, not accompanied by their husbands or not having husbands in the United States.

The regulations outlined above apply in all their force to third class passengers alone. Those of the second class are treated with less rigour. First class passengers are examined only in cases where the ship's medical officer reports the existance of some excluding affection. In that event the passenger is examined by the immigration medical officer, and if declared "undesirable," he is deprived of his personal liberty, and is liable to be transferred to Ellis Island, where his subsequent experiences do not differ appreciably from those of his poorer brethren of the third class.

Danis relates the tale of an English doctor, affected with trachoma, who went to New York to pursue his medical studies. But although he himself had declared the nature of the malady from which he was suffering, he was not allowed to land, and was returned by the same boat which carried him to the "land of the stars and stripes." SYDNEY STEPHENSON.

III.—OPERATIONS.

(FIRST NOTICE.)

(1) **Henderson, Thomson.**—The histology of iridectomy. *Ophthalmic Review*, July, 1908.

(2) **Menacho.**—A modification of the method of enucleation. *Eleventh International Congress of Ophthalmology*, Naples, 2nd to 7th April, 1909.

(3) **Wyler, Jesse S.**—Should we operate in high degrees of myopia? *Ophthalmic Record*, August, 1909.

(4) **Terson A.** — Simple anterior perforating sclerectomy in cases in which iridectomy is dangerous or insufficient. (La sclérectomie antérieure perforante simple dans les cas ou l'iridectomie est dangereuse ou insuffisante.) *Ann. d'Oculistique*, July, 1910.

(5) **Dickson.**—The operation of pannus dissection. *Ophthalmic Record*, August, 1910.

(6) **Bettremieux.—Simple sclerectomy in choroido-retinitis. (La sclerectomie simple dans la chorio-retinitis.)** *Recueil d'Ophtalmologie*, septembre, 1910.

(7) **Sweet, William M.—Implantation of a metal ball in Tenon's capsule (the Frost-Lang operation), with report of forty-eight cases.** *Archives of Ophthalmology*, September, 1910.

(8) **Angelucci.—A new corneal suture in the operation for keratoconus. (Une nouvelle suture de la cornée dans l'opération du kératocone.)** *Bull. de la Société Belge d'Ophtalmologie*, No. 29, 1910, p. 56.

(9) **Motais. — L'opération de Motais.** *Bull. de la Société Belge d'Ophtalmologie*, No. 29, 1910, p. 89.

(10) **Birch-Hirschfeld, A.—A further contribution to tarsoplasty according to Büdinger (employment of ear cartilage to form the lid). (Weiterer Beitrag zur Tarsoplastik nach Büdinger "Verwendung von Ohrknorpel zur Lidbildung.")** *Zeitschrift für Augenheilkunde*, November, 1910.

(11) **Thompson, A. Hugh.—The operative treatment of high myopia.** *Ophthalmic Review*, November, 1910.

(1) This paper, by **Henderson**, of Nottingham, is founded on the histological study of the same series of 33 cases which were used as a basis of a paper on "The Healing of Wounds after Cataract Extraction," published in the May number of the *Ophthalmic Review*. As the result of his researches, Henderson comes to the conclusion that the severed iris tissue after iridectomy never shows any signs of scar or other manifestation of reaction, and even for years after, the cut surface appears as if the operation had been done *post-mortem*. In the case of the iris "the tissue concerned is composed of a vascular layer of loose connective tissue which is bathed in lymph, and a simple trauma does not alter the relation of the severed tissue cells, either to each other or to their normal surroundings, so that there is no stimulus to cause the cells to hypertrophy or lay down a dense and protective layer. When, however, a stimulus is supplied by toxic or other agents, cicatrisation and sclerosis of the iris tissue follows in the same manner, and governed by the same principles, as elsewhere in the body." Six photomicrographs illustrate the communication. C. DEVEREUX MARSHALL.

(2) The modification introduced by **Menacho**, with the object of lessening the damage to the tissues of the orbit and at the same time obtaining a long section of the optic nerve, consists in cutting the tendons of the internal and external recti rather long and looping them up in a suture, by means of which the globe can be pulled forward before dividing the optic nerve.

ERNEST THOMSON.

(3) This question is discussed at some length, by **Wyler**, of Cincinatti, with many abstracted references to the literature on the subject, so that the contribution hardly lends itself to further abstract. Wyler concludes, however, that phakolysis is only justifiable when the myopia is at least one of fourteen dioptres; when the fundus and vitreous are fairly healthy; when the vision is too poor to allow the subject to follow his occupation properly; and, finally, when the patient is under 40 years of age. T. E. ASHDOWN CARR.

(4) **A. Terson**, of Paris, considers that in chronic glaucoma sclerecto-iridectomy (Lagrange's operation) is the operation of choice, but that simple perforating anterior sclerectomy is indicated in cases of hypertension in which

iridectomy is technically impossible, or would be likely to cause complications. He instances as such conditions.—1. Quiet iritis with pin-head pupil and total posterior synechiæ, or sympathetic ophthalmitis with extensive cyclitic synechiæ. 2. Progressive scleral staphylomata. 3. Glaucoma with subluxation of the lens or following cataract extraction, where division of a capsular or iridic incarceration is impossible or insufficient. 4. Possibly, some cases of hæmorrhagic glaucoma and infantile buphthalmos. He also considers that it should be tried in cases in which iridectomy and anterior sclerotomy have failed to give relief and in absolute glaucoma. He suggests that in intractable cases a series of small sclerectomies can be performed, while in other instances the condition of the eye may be so much improved by a sclerectomy as to make a sclerecto-iridectomy possible. R. J. COULTER.

(5) In severe cases of pannus with a thick vascular epicorneal growth **Dickson** (Mobile, Ala.) employs a method which he calls "pannus dissection" and describes as follows.—"The eye is thoroughly cleansed by irrigating the sac with a saturated solution of boric acid, followed by a 10 per cent. cocaine solution with a 1 : 1000 adnephrin solution. . . . The eye is seized by an assistant in the lower portion of the conjunctiva with fixation forceps. . . . Beginning at the sclero-corneal junction, 3 to 5 mm. from corneal margin, I make an incision through the conjunctiva down to the sclera, just as one would in doing a peritomy. I begin my dissection by 'rolling over' the flap after the peritomy, paying particular attention to the effort to get well under all the blood-vessels and next to the corneal tissues. I use for this purpose a pair of iris scissors and broad forceps that will not tear, but at the same time will hold securely the flap containing the vessels that are to be dissected off the eyeball. Stretching the flap, one can readily see a light space following the iris scissors as one makes the dissection. This tissue, in cases where there has been no ulcer, can be dissected evenly and smoothly; where there have been ulcers there will also be considerable adhesion to the corneal tissue, and it will be difficult to separate the pannus from the cornea. In these cases I dissect well round the ulcer sites, leaving these points to be afterwards smoothly trimmed with a cataract knife."

The after-treatment consists of douching with boric lotion, the use of cold compresses, and appropriate treatment for iritic tendency and errors of refraction. He deals with the lid condition by means of copper electrolysis.

J. JAMESON EVANS.

(6) **Bettremieux**, of Roubaix, finds that sclerectomy may be useful in cases of choroido-retinitis without hypertension. He cites three cases :—

CASE 1.—Male, aged 22 years. Right eye lost as a result of iridocyclitis and cataract, vision in left eye lost, except a little at the periphery from choroido-retinal lesions at the macula. After simple sclerectomy the patient recovered sufficient central vision to enable him to resume his work.

CASE 2. A woman, aged 43 years, suffering from choroido-retinitis with marked pigmentary deposits R.V. = $\frac{1}{200}$ L.V. = $\frac{1}{50}$. She also had pains in the head and orbits. Some contraction of the left visual field, especially outwards. Medical treatment having proved ineffectual, simple sclerectomy was performed on the right eye with marked relief of pain, and some improvement of right vision. A little later the symptoms recurred on the left side, and the patient returned to ask for operative treatment for the left eye. Sclerectomy was therefore performed on the left eye with satisfactory results.

CASE 3.—A man, aged 57 years. Choroido-retinal atrophy extending to the macular region, making it difficult for him to read or get about, headaches, photopsia. R.V. = $\frac{1}{6}$ $\frac{1}{3}$ c.— 2 ; L.V. = $\frac{1}{6}$ $\frac{1}{4}$ c.— 1·50. Sclerectomy on the left eye was followed by slight improvement later, the patient's demand for operative treatment for the right eye was complied with. R.V.— $\frac{1}{3}$; L.V.— $\frac{1}{4}$. Patient was afterwards able to follow his occupation without much inconvenience. J. JAMESON EVANS.

(7) The only contra-indications to implanation recognised by **Sweet**, of Philadelphia, are the removal of eyes with malignant growths or purulently inflamed, or of an atrophic stump. In most of his cases a gold ball was used, and in one case an X-ray plate showed a

gold ball implanted six years before, intact and free from erosion. In a few cases platinum balls were used, but these are not so light as the gold ones. Sweet finds the reaction after implantation usually no greater than after simple enucleation. In only two cases did the ball escape, and in two others the ball became partially exposed, although the edges afterwards again united, encouraged thereto by touching with mitigated silver stick (re-stiching is useless as the stitches cut out). Displacement occurred in no case. Sweet considers that displacement is favoured by suturing all the recti together in a bunch over the ball ; apparently, there was only one case of sympathetic disease, not going farther than irritation, among Sweet's cases, but he considers the subject very carefully, giving notes of five other cases in which it has occurred after implantation, but his conclusion is that no single instance can the implanted ball be positively regarded as the primary and exciting cause. The average amount of movement of the artificial shell in twelve cases was found to be upward 23°, downward 40°, inward 21° and outward 19°.

Rosa Ford.

(8) **Angelucci**, of Naples, has made experiments upon rabbits which prove that one may introduce, without reaction or pain, a thread into the parenchyma of the cornea. For this purpose he uses the needle and suture already praised by Kalt in extraction of senile cataract. It thus becomes possible to place a suture *en bourse* (a purse-string suture) in the cornea without penetrating the anterior chamber. Angelucci had a good result from this procedure in a case of conical cornea. The suture was first applied at a distance of about 2mm. from the opaque summit of the cone, the latter was next deeply burned with the cautery, and then perforated with the point of a narrow Graefe knife, and, lastly, the suture was tied. The immediate result was a notable flattening of the cornea. The suture was removed a week later.

Marcel Danis.

(9) **Motais**, of Angers, claims priority in the operation that goes by his name. He was the first to have the idea of supplying the inadequacy of the levator palpebræ superioris by an anastomosis between part of the superior rectus and the eyelid. In the present communication he begins with explaining the anatomical and physiological reasons which gave him the idea of attempting this operation, and he then describes the *technique* which he actually adopts. He passes a suture of which the loop involves the median portion of the tendon of the superior rectus muscle. The two ends of the thread are knotted, and a tongue, as it were, is cut in the median portion of the tendon. Into a button-hole, cut by means of scissors in the upper eyelid, anterior to the tarsus, the ends of the thread are passed, and, lastly, they are sutured to the skin. The result of the operation may be increased by excising a little skin from the eyelid. It may happen that the superior rectus muscle is badly developed. Under these circumstances it becomes difficult to dissect out a tongue, as in the ordinary operation. The modification of the operation carried out by Sydney Stephenson (*Trans. Ophthal. Society U.K.*, Vol. XXXIX, p. 6) may then be adopted. It consists in cutting loose from its attachment the inner half of the tendon, and in stitching it to the eyelid, as described above. Diplopia is common after the operation, but it invariably disappears with lapse of time. The results, dynamic and æsthetic, of the operation are much superior to those of the other operations for ptosis which have been described and practised.

Marcel Danis.

(10) **Birch-Hirschfeld** (Leipzig).—The photograph which is found in this paper shows a perfect result obtained by this method, which consists of using a piece of cartilage cut from the outer ear to replace the tarsal plate. The skin of the lid is supplied by a flap from the cheek or forehead. The

method is useful when a rodent ulcer of the lid necessitates free removal of skin and tarsus. These plastic methods can be fully grasped only when numerous diagrams are given of the various stages of the operation. These are wanting in this paper. A careful study of Büdinger's paper, which is to be found in the *Wiener klin. Wochenschrift*, 1902, S. 513 and 648, is therefore advisable before attempting the operation. T. HARRISON BUTLER.

(11) The conclusions reached by **A. Hugh Thompson**, of London, are:—

1. *Degree of myopia suitable for operation.*—He finds that the average refraction after removal of the lens may be expressed by a formula $\frac{My}{2}$ + a figure varying between 9 and 13, but averaging 10.5, and considers that in cases above—16D. it is justifiable to operate, where there are no other contra-indications.

2. *Age.*—The age limits of his cases were 6 and 25 years. Operation is not advisable over 30, owing to the less ready absorption of the lens matter after needling, and the greater likelihood of degenerative changes in the fundus.

3. Growth of the long axis of the eye after operation is neither hastened nor delayed.

4. *State of the Fundus.*—An irregularly defined crescent, or irregular areas of choroidal atrophy outside the crescent, or macular changes, or vitreous opacities are contra-indications to operation. He does not consider the operation tends to cause or to prevent choroiditis or macular change.

5. *Condition of the second eye.*—The operation should be done on the eye with the higher myopia, where the amount is unequal. It should not be done where the second eye is emmetropic or diseased.

6. *Operative procedure.*—The author prefers one free needling, followed in nearly all cases by curette evacuation.

7. *Visual result.*—In seventeen cases good results were obtained, ten having distant sight without a glass equal to or better than previously with a correcting glass, and seven requiring a low plus glass; with regard to near vision five preferred to use the operated eye for all purposes with or without a glass, and eight the unoperated eye.

8. *Question of operating on the second eye.*—This does not seem advisable in view of possible risks.

9. *Possible causes of failure.*—First group.—(1) infection; (2) secondary glaucoma from delayed evacuation or, at a later date, from some obscure cause; (3) cyclitis. Second group.—Macular degeneration, choroiditis, and hæmorrhage, all of which may occur in the unoperated eye. Third group.—Detachment of the retina. In reviewing statistics of other observers, the author is of opinion that the operation does predispose to this condition in the first year, and in a large proportion of the cases where it occurred there was a loss of vitreous, a point against removal of the lens by linear extraction. A. H. PAYAN DAWNAY.

IV.—TOXIC AMBLYOPIA.

(Quinine, Methyl Alcohol, Lead, Tobacco, Diabetes, Santonine, and Arsenical Preparations.)

(1) **Alexander, E. W.**—Eye changes in chronic lead poisoning with report of a case. *Ophthalmology*, Vol. V, July, 1909.

(2) **Higgins, R. P.**—Toxic amblyopia. *New York State Journ. of Medicine*, December, 1909.

(3) de Schweinitz, G. E.—Concerning quinine-blindness, with the report of a case. *Archives of Ophthalmology*, March, 1910.

(4) Reber.—Toxic amblyopia of diabetic origin occurring in a young woman. A rare symptom of the toxæmia of diabetes. *Ophthalmic Record*, March, 1910.

(5) Dunn, Percy.—Tobacco amblyopia. *Hospital*, 23rd April, 1910.

(6) Gruening, E.—Methyl alcohol amblyopia. Clinical records and historical study. *Archives of Ophthalmology*, July, 1910.

(7) Schirmer, Otto.—On optic-nerve diseases due to poisoning with organic and inorganic arsenical preparations. *Archives of Ophthalmology*, September, 1910.

(8) Baxter, E. J.—Note on a case of loss of vision following a small dose of santonin. *Lancet*, 10th December, 1910.

(9) v. Grosz, Emil.—On optic atrophy caused by poisoning with methyl alcohol. (Ueber Sehnerven-schwund verursacht durch Methy-alcohol-Vergiftung.) *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1910.

(10) Costantino, T.—A clinical contribution to the study of the amblyopia and amaurosis produced by atoxyl poisoning. (Contributo clinico allo studio delle ambliopie e delle amaurosi tossiche prodotte dall'atoxil.) *Archivio di Ottalmologia*, Vol. XVIII, March, 1911, p. 573.

(11) Maucione, L.—Another case of blindness due to atoxyl. (Ancora un caso de cecità per atoxil.) *Archivio di Ottalmologia*, Vol. XVIII. June, 1911, p. 769.

(12) Ziegler, S. Lewis.—Total blindness from the toxic action of wood alcohol, with recovery of vision under negative galvanism. *Ophthalmology*, July, 1911.

(13) Manolescu, D. N.—A case of quinine amaurosis. (Ueber einen Fall von Chininamaurose.) *Klin. Monatsbl. f. Augenheilkunde*, September, 1911.

(2) **Higgins**, of Cortland, N.Y., urges the necessity of the general practitioner being alive to the toxic amblyopias, since patients affected with these disorders usually fall first into the hands of the family medical attendant. He groups the cases into I. acute, as from methyl alcohol, quinine, and male fern, and II. chronic, as from abuse of tobacco and alcohol. It is most probable that the poisons responsible for toxic amblyopia primarily attack the ganglion cells of the retina and secondarily cause ascending degeneration of the optic nerve and tracts. The primary change in the ganglion cells is probably of a chemical nature. SYDNEY STEPHENSON.

(3) The case differed from ordinary cases of quinine blindness, in that areas of preserved visual field occurred in the temporal halves of both fields. **de Schweinitz**, of Philadelphia, supposes these to be due to unequal affection of the ganglion cells, degeneration of which causes the loss of vision. There was moderate streaking with white of the retinal vessels near the optic disc, but nowhere any sign of a thrombus. The patient showed the susceptibility to small doses of quinine which has been observed before. Caffeine also reduced the area of the field of vision. ROSA FORD.

(4) **Reber**, of Philadelphia, records four cases of toxic amblyopia in men varying in age from 29 to 56, who were addicted to alcohol, and tobacco, and

had sugar in the urine to the extent of 1½ to 3 per cent. Three had relative central and paracentral scotoma and one an absolute scotoma in each eye. Vision ranged from 5/15 to 5/45 and improved somewhat under treatment.

In support of the view that diabetes alone can cause symptoms and signs like those of tobacco and alcohol, he recites the case of a woman, aged 29 years, who had glycosuria and paracentral scotoma for colours. Vision was reduced to 5/9 with correction, and there were no ophthalmoscopic changes or peripheral limitation of the fields. Similar cases recorded by others are referred to. J. JAMESON EVANS.

(5) **Dunn**, of London, lays great stress upon chronic gastritis as a factor in the production of tobacco amblyopia. He supposes either that elimination of the tobacco alkaloids is interfered with or else that a new toxin may be created by combination with the alkaloids, more poisonous in its effects than even the tobacco bases themselves. SYDNEY STEPHENSON.

(6) **Gruening**, of New York, has observed 10 cases of methyl alcohol amblyopia in one year. Of two of these he gives an account. In one, there was an atrophic excavation of the disc, exactly resembling that of glaucoma, but with no increase of tension or any symptom of glaucoma. ROSA FORD.

(7) **Schirmer** reports two cases of optic atrophy after the use of organic arsenic preparations, one of which was the French atoxyl, which the author believes to have been the first reported case, although Coppez has since reported another. Schirmer has searched the literature for optic nerve affections due to inorganic arsenic preparations but could discover only six. Not one showed the same features as the atoxyl amblyopia. In these cases there is probably a primary optic neuritis, and the prognosis is very good, recovery occurring in all cases after discontinuing the drug. The characteristic effect of the organic arsenical preparations of the atoxylon group is progressive optic atrophy, originating without inflammatory changes and ending in blindness. An exception, is perhaps, to be found in Cacodyl. That the blindness is not due to the disease for which the arsenic is given, is proved by the facts that it has occurred in several diseases never known to produce optic atrophy, and also that the clinical picture of this form of optic atrophy is distinct from that due to other causes. All the arsenic compounds of the atoxylon group produce the same characteristic features, and it therefore seems that the primary drug is not the poisonous one, but that it is changed in the body into other compounds, which are, perhaps, the same in all these different preparations. The common features of this optic atrophy are: onset with haziness, scintillation, and contraction of the visual field, especially on the nasal side: there is gradually increasing pallor of the disc, and blindness is rarely avoided, for it depends entirely on idiosyncrasy, some patients reacting unfavourably to small quantities. One large dose is less likely to cause blindness than repeated small ones.

ROSA FORD.

(8) **Baxter** reports the case of a girl, five years of age, in whom half a grain of santonin caused complete blindness. She was kept under observation for six weeks, but at the end of that time still remained blind. Unfortunately, the writer, who resides at Dar-es-Salaam, German East Africa, does not enter into any details as to the cause of the blindness. ERNEST THOMSON.

(9) **Emil v. Grosz** (Budapest).—Early last year ten patients came to the *Clinic* at Budapest, who had all become blind within a few days. Most of them said they had drunk tea with a little rum. In a few hours or days they became blind Six of them had no perception of light, the others could count fingers and in them a central scotoma could be demonstrated. The pupils were dilated and did not react. The fundus was at first normal, but later

optic atrophy developed, which was especially marked on the temporal side. Still later, the atrophy took the form of a deep glaucoma-like cup; so much so that had the cases not been seen at the commencement of the disease, they would have been diagnosed as glaucoma. At the same time many cases of poisoning by brandy were reported in Hungary, in quite a short time over 70 persons died. In one place 13 out of 30 who had dined together died. In yet another place after drinking rum, 13 persons were poisoned, 6 were blinded, and 6 died. It is remarkable that many persons after the first feeling of illness, returned to work. One or two days later, sleepiness and listlessness came on and a few hours later they were found dead. These cases were all traced to one distillery where the spirits had been adulterated with methyl alcohol. The distillery was destroyed by fire, the director decamped, and no more cases of poisoning were reported. Investigation showed that very small doses of methyl alcohol were sufficient to cause symptoms of poisoning, and a very small amount may cause blindness. Some of the patients had only had one or two tea-spoonfuls of the adulterated rum. It is probable that the poison acts upon the ganglion cells of the retina and their death is followed by an ascending atrophy of the nerve fibres. T. HARRISON BUTLER.

(10) In a long paper, which is an abbreviation of his Inaugural Thesis, **Costantino**, of Palermo, describes atoxyl and gives its chemical composition. He then proceeds to detail the symptoms found in association with its therapeutic employment, quoting freely the names of writers on the subject. A case is then described in which amblyopia resulted from the administration of gradually increased doses of atoxyl. Beginning with 15 centigrammes *per diem* for three days, the dose was increased to 30 c.grm. for three days and then raised to 45 c.grm. Then the vision became clouded and colour perception weak. The visual field was constricted and there was a paracentral scotoma. Treatment by atoxyl was stopped and strychnine substituted but no good result followed. The case is discussed in all its bearings, and a full bibliography is given. LESLIE BUCHANAN.

(11) **Maucione** saw a man of 40 years of age who had syphilis, and was ordered injections of atoxyl on account of severe cachexia. The vision was good until five injections had been given, when it rapidly declined. The injections were persisted with, and after ten more, the man was practically blind. When seen at the Naples *Clinique* the sight was entirely gone, and the optic nerves were atrophic. Injections of strychnine were ordered, with iodide internally, but the result was negative. LESLIE BUCHANAN.

(12) The toxic action of wood alcohol may arise through ingestion, inhalation, or cutaneous absorption. Wood alcohol or methyl alcohol is available in many different forms. It may be taken as the pure spirit, or as "Columbian Spirits," or as an ingredient of cheap rums, brandies, and whiskies. It is found in some brands of eau-de-Cologne, Florida water, bay rhum, and other toilet extracts. It may also be imbibed with Jamaica ginger, lemon extract, essences of peppermint, cinnamon, and capsicum, and in a variety of proprietary and patent medicines. It has been used to "fortify" ginger ale and ginger beer and bottled cider, and, lastly, it may be inhaled during its use in many industrial processes. The acute toxic symptoms are headache, dizziness, weakness of extremities, nausea, abdominal pain, chilliness, physical prostration, delirium, stupor, and sometimes death. Blindness is usually not observed until the stupor passes off.

Ziegler's patient was partially blinded by inhaling the fumes for one hour daily in a factory. Recovery, although slow and incomplete, was very satisfactory. The treatment recommended for such cases is alterative and eliminant—emetics and permanganate of potash immediately, and, later, pilocarpin, thyroid extract, hyoscin, iodides, Donovan's solution, and diaphoretics. The author puts down the good result in his case largely to the use of "negative galvanism." A. J. BALLANTYNE.

(13) **Manolescu,** of Bucharest, reports his case in some detail, and gives charts to illustrate the progressive improvement in fields of vision. The case was in almost every respect typical. Loss of vision was absolute. Central vision began to return in eight days, and had fully recovered in one eye in fourteen days. The restoration of the fields of vision occupied about a year, and an unusual feature was that from the first the field for blue was smaller than that for red. The treatment employed was strychnine injections, steam baths, and, later, the galvanic current; but from a comparison of the progress in the many reported cases, under many different kinds of treatment, he concludes that the course of the disease is little influenced by the nature of the treatment. A. J. BALLANTYNE.

V.—TRANSPLANTATION AND REGENERATION OF THE CORNEA.

(1) **Löhlein, W.—On corneal transplantation. (Ueber Hornhautransplantation.)** *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1910.

(2) **Salzer, F.—On the regeneration of the Cornea. (Ueber die Regeneration der Hornhaut.)** *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1910.

(1) **Löhlein,** of Griefswald, has devised a new operation for replacing leucomatous corneal tissue by transparent tissue from the eye of an animal of the same species. After numerous successful operations upon rabbits, he successfully treated a leucoma in a man by transplanting from a recently enucleated eye. The graft remained almost transparent, and vision rose from 1/60 to 1/9. The operation is performed as follows.—With a special double knife whose blades are separated by a distance of from 5 mm. to 7 mm. he marks out a flap which includes the whole centre of the cornea vertically from limbus to limbus. At each extremity the conjunctiva is dissected up a little way, and then the flap is dissected off with a cataract knife. A similar flap is removed from a sound cornea in exactly the same way and placed in the defect of the diseased eye. A few sutures at each end suffice to fix the graft *in situ*.

T. HARRISON BUTLER.

(2) **Salzer**, of Munich, has shown that an aseptic trephine hole in rabbits' cornea heals perfectly leaving a transparent cicatrix. He comes to the following conclusions:—

There is a true regeneration of the cornea.

Descemet's membrane regenerates with the greatest difficulty.

Blood vessels take no part in the process.

The cells forming the young corneal fibres first appear close under the epithelium, which takes the chief share in regeneration. The accumulation of cells in the region of the wound is due to cells wandering in from the edge of the defect and by amitotic division of these same cells.

The fixed corneal cells play no part in the process.

The involvement of the endothelial cells and the entrance of fibroblasts from the iris are incidental. T. HARRISON BUTLER.

VI.—PATHOLOGY.

(First Notice).

(1) Zeeman, W. P.—On hyaline and amyloid degeneration of the conjunctiva. (Over hyaline en amyloide degeneratie van het bindvlies.) *Nederlandsch Tijdschrift voor Geneeskunde*, 1908, p. 1080.

(2) Villard, H.—Congenital serous cyst of the sclerotic. (Kyste séreux congénital de la sclérotique.) *Archives d'Ophtalmologie*, janvier, 1910.

(3) Markbreiter, Irene.—Histological data concerning the formation of the glaucomatous cup. (Histologische Daten zur Entstehungskenntnis der glaucomatosen Excavation.) *Arch. f. Augenheilk.*, Mai, 1910.

(4) Mendez, Enrique.—Orbital cyst arising from displaced mucous membrane. (Orbitalzyste von Versprengter Schleimhaut ausgehend.) *Klin. Monatsbl. f. Augenheilkunde*, Mai-Juni, 1910.

(5) Reis.—On diffuse papilloma growth of the cornea. (Ueber diffuse Papillomatose der Cornea.) *Zeitschrift für Augenheilkunde*, August, 1910.

(6) Napp.—A contribution to the question of the origin of the atypical choroidal coloboma. (Beitrag zur Frage der Entsehung der atypischen Aderhautcolobome.) *Zeitschrift für Augenheilkunde*, August, 1910.

(7) Alt, Adolph.—A case of cystic adeno-carcinoma of the lid. *American Journal of Ophthalmology*, September, 1910.

(8) Könneche, K.—A contribution to the pathology of coloboma of the optic nerve. (Beitrag zur Pathologie des Opticus Koloboms.) *Zeitschrift für Augenheilkunde*, September, 1910.

(9) Monte, Alberto Del.—A contribution to the study of amyloid degeneration of the conjunctiva and of the lids, with special regard to certain points not yet known. (Contributo allo studio della degenerazione amiloide della, congiuntiva e delle palpebre con speciale riguardo a taluni reperti non ancora conosciuti.) *Archivio di Ottalmologia*, Agosto, Settembre, Ottobre, Novembre, 1910.

(10) Greeff, R.—Studies in the pathology of vitreous fibrils. *Archives of Ophthalmology*, September, 1910.

(11) Franke, E.—On a peculiar form of superficial corneal disease. (Ueber eine eigenthünliche Form von oberflächlicher Hornhauterkrankung.) *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1910.

(12) Vossius.—On pigment scattering upon the iris. (Ueber Pigment Zerstreuung auf der Iris.) *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1910.

(1) **Zeeman** found this rare condition in a child suffering from trachoma. On one eye there existed not only the granulations and cicatrices of trachoma, but also some semi-transparent tumours, partly situated in the conjunctiva tarsi of the lower lid, and partly in the conjunctiva of the eye, and in the plica semilunaris. These tumour-like formations were excised as far as possible, in the hope that the rest, as is often seen in these cases, would disappear without further intervention. A histological examination was made. On the whole, there was a marked proliferation of lymphoid tissue, in which

were embedded, here and there, pieces of hyaloid and amyloid material. On the various reactions of these substances the author offers some interesting remarks, which, however, do not lend themselve to abstract. Such a deposit of hyaloid and amyloid is not indifferent to the original tissue, as appears from the presence of a great many giant-cells in the immediate neighbourhood of the deposits. G. F. ROCHAT.

(2) **Villard**, of Montpellier, records the occurrence, in a boy of 5 years, of a serous cyst of the sclerotic, congenital in origin.

A small swelling on the inner side of the cornea was noted by the parents at birth, but, remaining stationary for some time, no advice was sought. After a severe attack of measles, however, at the age of 4, the swelling slowly increased, and at 5 years, when first seen by Villard, it had reached the size of a haricot bean. There was no history of injury, and the family, including the patient, was a particularly healthy one, with no record of congenital anomalies.

Situated with its long axis vertical, the swelling could be felt to be firmly fixed to the sclerotic beneath ; it lay close to, and even encroaching slightly on, the cornea ; the overlying conjunctiva was thinned and slightly vascular. In other respects the eye was normal and vision good.

It was found impossible to remove the cyst in its entirety. The anterior wall, therefore, was excised, and the posterior wall, which was formed by the sclera itself, was cauterised, a shallow concavity remaining to mark the site of the cyst.

Practically speaking, the cyst was constituted by a cleft in the anterior layers of the sclerotic, lined with epithelium.

The cyst contents were a clear serous fluid. Histologically, the cyst wall was found to be made up of two parts :—a fibrous layer, free in front from the bulbar conjunctiva, and an epithelium lining the cavity. The epithelium showed all the characters of that of the bulbar conjunctiva but with two exceptions (1) an absence of mucous cells, and (2) there was no adenoid layer present, the cells resting directly on the subjacent fibrous membrane. The fibrous layer showed that it was scleral tissue.

Villard explains the formation of the cyst by the supposition that some of the epithelial cells which go to form the bulbar conjunctiva were included in the mesoblast surrounding the optic cup which afterwards becomes the sclerotic coat. Very few of these cysts have been recorded.

BERNARD CRIDLAND.

(3) **Markbreiter** gives the histological details of an eye excised after a first attack of acute glaucoma. About 7 mm. of the optic nerve were removed accidentally when the eye was enucleated. Serial sections were made, and the following changes were found.—At the point where the nerve had been severed, the nervous structures were healthy, but the walls of the central vessels showed some thickening, especially in the adventitia. A little further on, small, round, badly-staining patches of degeneration appeared around the central vessels. The septa were normal, but on the temporal side they were mostly covered with dense pigment, perhaps the remains of a hæmorrhage. In the following sections, the nervous substance in the areas of degeneration disappeared, the neuroglia round them became more dense and sent in processes to take the place of the disappearing structures. Still further on, this replacement appeared to be inadequate, and empty spaces occupied the position of the areas of degeneration. Finally, three spaces, separated by dense fibrous septa, remained in the section. Seen with the naked eye before the sections were made, these spaces appeared as three hollows in the disc, separated by three ridges. The writer discusses the various theories advanced by different writers on the subject of the excavation of the optic disc.

PERCIVAL J. HAY.

(4) **Mendez** describes the case of a woman, aged 56 years, who first noticed swelling under the lid 25 years ago. It increased in size very slowly, and when seen by Mendez, there was a roundish, elastic, moderately prominent tumour under the right upper lid in the region of the trochlea. An ethmoidal mucocele was thought of, but the nasal cavities and accessory sinuses were normal. When the cyst was removed, it was found to be free from communication with any adjacent sinus, nor was it adherent to the bone. A viscous, yellowish fluid escaped from a tear in the cyst-wall. Microscopical sections showed a thick fibrous wall and a central cavity lined with mucous membrane similar to that of the nose. C. MARKUS.

(5) Papilloma of the limbus is not uncommon, but papillomata growing from the cornea itself are infrequent. **Reis**, of Bonn, describes a diffuse growth of the cornea which showed a tendency to recurrence when removed. The patient died of hæmoptysis, and the eye was sectioned. In places the papillomatous growth showed a tendency towards downgrowth, and was, in fact, verging towards carcinoma. T. HARRISON BUTLER.

(6) This paper by **Napp**, of Berlin, is illustrated by a plate which clearly demonstrates the condition found at the coloboma. It is a beautiful example of those coloured drawings of sections which so frequently adorn German monographs. The eye, which had not been examined with the ophthalmoscope, was taken from a child who died at the age of one year from pertussis. The coloboma lay outwards from the papilla and could not be ascribed to failure of closure of the fœtal cleft. There were no signs of any misplacement of the retina into the choroid. The pigment epithelium and lamina vitrea were rolled back on either side of the coloboma, and the rods and cones were absent from this situation. The whole choroid was in a condition of aplasia. It was extraordinarily thin and undeveloped. Smooth muscle was better developed in the choroid than connective tissue. Pigment cells were infrequent. The author suggests that the undeveloped choroid was torn by the powerfully developed ciliary muscle. There were no signs of inflammation. There might have been an accident to the eye, but no history of one could be obtained. T. HARRISON BUTLER.

(7) The histological details of this new growth, which had been located at the inner canthus, at the margin of the upper lid and extending half way around the lacus lacrymalis, should be read in the original. "The surface of the tumour (which had been present for six months) was elevated a little above the surrounding skin. It was slightly scaly and rough, and looked much like a common wart. The colour was the same as that of the surrounding skin, and no inflammation was visible. Nor was there any tenderness of the part." The above statement as to the naked-eye characters of the growth *in situ* were supplied to **Alt**, of St. Louis, by the surgeon who had excised it. ERNEST THOMSON.

(8) **Könneche**, of Marburg, gives the details of a histological examination of a rabbit's eye, which showed colobomata of the iris, choroid, and optic nerve. T. HARRISON BUTLER.

(9) In this very long and carefully worked out paper **Del Monte**, of Naples, has gone to the root of the matter in regard to the origin and course of the process of degeneration of the conjunctiva which results in the change known as "amyloid." The paper was awarded the *Premio di Vincentiis* (a gold medal) and also the silver medal of the Minister of Public Instruction for microphotography, at the Eleventh Congress of Ophthalmology. The work extends through some 200 pages of the journal and there are added a large number of microphotographs, printed on suitable paper, which illustrate the subject matter. Such a contribution does not lend itself well to

abstracting and the best one can do is to say that for any student of the special subject it is well worthy of perusal. The author kindly assists us in some measure by giving a brief *résumé* of the paper at the beginning of each part. This is somewhat as follows:

Primary alteration of the blood-vessel walls: frequent hæmorrhages and participation of the stroma of the red blood corpuscles in the formation of amyloid material. Formation of "giant-cells" near the vessels. Intravascular amyloid degeneration of leucocytes and details of their morphology. Ultimate transformation of the amyloid material into crystalline calcareous substance.

The process is divided into four stages, as it were, and each of these has characteristics of its own. LESLIE BUCHANAN.

(10) **Greeff,** of Berlin, on the basis of some years' study, finds himself in part at variance with the accepted views as to the pathology of the vitreous; he lays special emphasis on the examination of fresh specimens, because those which have been hardened show changes which may be ascribed to the process of preparation for examination. In the absence of any detection of karyokinetic figures, he believes that probably only migratory cells occur in the vitreous. Greeff thinks that there is no such thing as "fibrillary degeneration of the vitreous," but that what has been taken for this was a delicate coagulum formed by the hardening fluid in cases where fibrinogen ferments have gained access to the vitreous in the presence of a recent acute inflammation. "The vitreous fibril," says Greeff, "once it has attained full growth, is unchangeable; incapable of division, reproduction, or after-growth; so that there is no regeneration of the vitreous, although there may be fresh secretion of fluid." "The only change which the vitreous fibril undergoes is its dissolution." "Organisation" of the vitreous can, of course, take place with the formation of blood vessels, etc. Retinal detachment is not caused by shrinking of the vitreous, since if it is possible to examine a fresh case, the vitreous is found to be without the slightest trace of fibril formation and absolutely free of the retina. Greeff considers "detachment of the vitreous" to be an artefact caused by hardening. ROSA FORD.

(11) The disease described by **Franke,** of Hamburg, is very similar to recurrent traumatic erosion, but there was no history of a traumatism. The traumatic erosion, too, is cured by scraping off the diseased epithelium and painting with chlorine water, but this peculiar disease resists this treatment. The microscopic examination of the detached epithelium is also different. Ballooning of the epithelial cells is present, but no degeneration of nuclei.

T. HARRISON BUTLER.

(12) **Vossius,** of Giessen, draws attention to the fact that if an eye which has been iridectomised, or one in which the iris has been wounded, be examined with a powerful Czapski *loupe*, fine pigment will be seen to be peppered all over the iris and on the back of the cornea. It may also be seen in siderosis and in some other conditions. T. HARRISON BUTLER.

VII.—CORNEAL NEBULÆ AND MYOPIA.

(1) **Amman, E.—Corneal nebulæ and defects of vision. (Hornhautnarben und Sehstörung.)** *Zeitschrift für Augenheilkunde*, November, 1909.

(2) **Steiger, A.** — Are corneal nebulæ a cause of myopia? (Sind Hornhauttrübungen eine Ursache der Myopia?) *Zeitschrift für Augenheilkunde*, Januar, 1911.

(1) **Amman,** of Winterthur, discusses the influence of corneal opacities upon vision. He has repeated Hirschberg's experiments on the effect of partially covering the object glass of a camera with tissue paper. Amman, who photographed Landolt's test types, finds that the blurring is not so pronounced as Hirschberg states. The plate shews the effect produced. When, however, the light value between the letters and their background is diminished, the letters only being a little lighter than the background, the effect of partially covering the lens is much greater, as the illustrations show. This fact is borne out by clinical experience; a macula causes much more serious disturbance of every-day vision than tests with the types would seem to indicate. A plate shows drawings of maculæ, and appended to each is the visual acuity of the eye in question, and also of its fellow.

When they first appear, maculæ cause considerable dazzling and disorder of binocular vision, but after a time, this defect tends to disappear.

The subject has recently been treated from a different, and perhaps more practical standpoint, by the same author, in a paper read at the Heidelberg Congress, 1908 (*Bericht*, 1909). T. HARRISON BUTLER.

(2) **Steiger,** of Zürich, after a careful consideration of statistics drawn from his examination of 4,676 school children, at intervals separated by about five years, concludes that corneal nebulæ have no influence whatever in the causation of myopia. In fact, his statistics rather prove the opposite.

T. HARRISON BUTLER.

VIII.—OPHTHALMOLOGY AND GENERAL MEDICINE.

(FIRST NOTICE.)

(1) **Paparcone, E.**—The eye symptoms of progressive facial hemiatrophy. *Annali di Ottalmologia*, Vol. XXXVI (1907), fasc. 3-4, p. 257 to 266.

(2) **de Schweinitz, G. E.**—The eye and the kidney. *Pennsylvania Medical Journal*, November, 1907.

(3) **Parkinson, J. Porter and Hosford, J. Stroud.**—Cerebellar tumour with proptosis. *Ophthalmic Review*, May, 1908.

(4) **Best, F.**—Pathological changes in the visual sphere of the brain in cerebral blindness. (Pathologische Veränderungen in der Sehsphäre des Gehirns bei cerebraler Erblindung.) *Bericht der Ophthalmologischen Gesellschaft zu Heidelberg*, 1908, S. 203 (Volume published in 1909).

(5) **Appleman, Leighton F.**—Relation of the eye to general disease. *Therapeutic Gazette*, 15th July, 1909.

(6) **Kipp, Charles J.**—Recurrent hæmorrhages in the retina and vitreous followed by retinitis proliferans in both eyes in a young man with surgical tuberculosis. *Archives of Ophthalmology*, July, 1909.

(7) **Angélis, Philippe.**—Double infective iritis of intestinal origin. (Iritis double infectieuse d'origine intestinale.) *La Clinique Ophtalmologique*, 10 août, 1909.

(8) **Hirschberg, J.**—**Two old cases of syphilis with eye symptoms. (Zwei alte Fälle von Lues mit Augen-Symptomen.)** *Centralbl. f. prak. Augenheilk.*, Oktober, 1909.

(9) **Shoemaker, W. A.**—**Ocular manifestations of syphilis of the central nervous system.** *American Journal of Ophthalmology*, June, 1910.

(10) **le Roux.**—**Paralysis of external rectus, diphtheritic in origin. (Paralysis diphtériene du droit externe de l'œil.)** *L'Ophtalmologie Provinciale*, juin, 1911.

(11) **Gordinier, Hermon C.**—**Exophthalmos, a common symptom of chronic Bright's disease.** *New York State Journal of Medicine*, August, 1911.

(12) **Calhoun, F. Phinizy.**—**The association of Uncinariasis (hook-worm disease) with cataracts.** *American Journal of Ophthalmology*, September, 1911.

(1) After a thorough study of one case, **Paparcone**, of Florence, concludes that the eye symptoms which accompany progressive facial hemiatrophy support the theory which attributes the affection to a lesion of the trigeminus consecutive to an alteration of the sympathetic. A. ANTONELLI.

(2) **de Schweinitz,** of Philadelphia, emphasizes the fact that the most frequent manifestations of renal retinitis consist in optic nerve congestion, small scattered hæmorrhages and dots in the macular region, and fluffy exudates in the periphery of the fundus oculi. He is convinced that in a certain percentage of cases in association with the indications of arteriosclerosis, there is an intraocular angiosclerosis with alterations in the calibre of the retinal vessels, 'indentations of the underlying veins, and slight perivascular changes in the form of the so-called 'silver wire' arteries; all of which are significant of a process which may eventuate in a chronic interstitial nephritis that has not produced the ordinary so-called "renal retinitis." He states that the presence of normal vision does not in any sense exclude the existence of retinal lesions of chronic Bright's disease, and says that no patient is properly examined until the ophthalmoscope has been used in expert hands, and, then, preferably after artificial dilatation of the pupil. C. A. O.

(3) The patient was a well developed girl, aged 14 years, who had suffered, off and on, from pains in the back of the neck, and rheumatic pains in the limbs, with headache and sickness. She had two convulsions followed by proptosis and diplopia. She showed symptoms of profound nervous disease; she could hardly stand; her knee-jerks were absent, and there was great proptosis. There was intense neuroretinitis with hæmorrhages in both eyes. The vision was reduced to counting fingers. Fits came on almost daily with occasional vomiting, and the temperature was subnormal; the vision became worse and the disease atrophic. She died suddenly with symptoms of asphyxia eleven months after the first symptoms of the disease manifested themselves.

At the autopsy, the cerebral ventricles contained a large quantity of fluid. Attached to the pia mater on the under surface of the right lobe of the cerebellum was an irregular, flattened, well circumscribed, encapsuled, very firm pink growth, about the size of a large pigeon's egg, and containing old blood clot in the centre. The whole growth was wedged between the long wall and the right side of the medulla. Microscopic examination showed it to be fibro-psammoma. Proptosis with cerebellar tumour is very rare, and, so far as the authors are aware, only three cases have been previously reported.

C. DEVEREUX MARSHALL.

(4) **Best**, of Dresden, has previously pointed out that glycogen, which is not normally present in the eye, may be detected there in many conditions of the organ. It is probably a reaction product of some deleterious substance which is acting upon the eye. The question is of interest in diabetes. In a case of diabetic coma, Best has found glycogen in the brain, and regards it as also a product of the action of those substances which give rise to coma. He has recently detected glycogen in the brain in a case where sarcoma of the left precuneus and cuneus gave rise to amaurosis. T. HARRISON BUTLER.

(6) A lad, of 18 years, had a paresis of the right external rectus which disappeared in the course of a year. The fundi were at this time normal. Three years later there were vitreous hæmorrhages in both eyes. These recurred, and were followed by retinitis proliferans, extensive in the right eye, slight in the left. At 25, the man's health was excellent, R.E. blind, L.V. 6/8. The cause of the condition was obscure. At 17 years, a tuberculous hip had been successfully operated upon. At 20 years, a severe blow on the L.E. had caused a separation of the iris from its temporal margin, but no complaint of loss of sight was made till a year after the accident, when the vitreous hæmorrhages were discovered in both eyes. Calmette's reaction was positive. A chronic otorrhœa, dating from an attack of double otitis media at six years old, led, at the age of 21 years, to a radical mastoid operation of the left side. **Kipp**, of Newark, N.J., does not state if the condition of the nasal accessory sinuses was inquired into. It is possible that the sphenoidal sinuses had become infected from the long-standing middle ear disease through the Eustachian tubes, and by pressure on the cavernous sinuses, situated immediateiy above them, had caused both the temporary paresis of the sixth cranial nerve (lying in the cavernous sinus) and the vitreous hæmorrhages, from stasis of the blood in the ophthalmic veins. The retinal views are stated to have been full and tortuous. ROSA FORD.

(7) **Angélis** relates at great length the case of a married woman of 24 years, without any suspicicn of syphilis in herself, her husband, or her family, who had a double exudative iritis, associated with anæmia, constipation, anorexia, etc. The main point about the case, assuming the correctness of the diagnosis, and, in particular, the exclusion of syphilis, is that the iritis got rapidly well under intravenous injections of 1 c.c. of 1 per cent. solution of cyanide of mercury, intestinal antisepsis, and correction of the constipation, with light diet, and atropin locally. The author draws general conclusions as to the value of mercury in iritis, no matter what the cause, and pleads for intravenous injections of cyanide. Ordinary internal administration is too slow, and allows organization of the exudate to take place. ERNEST THOMSON.

(8) **Hirschberg**, of Berlin, recounts two cases, of interest on account of the long histories.

The first case, a woman, came to him in January, 1893, and she was then 54 years old. She had been infected with syphilis twenty-seven years before—when she suffered from secondary and some tertiary symptoms during the first year of the disease. Eight years later, she had giddiness, deafness, and some mental disturbance, and was treated with mercury and potassium and iodide. In 1885 a gumma appeared on the right temple, and in 1890 she was given twenty inunctions, in 1891, fifteen, and in 1892, ten. She had been deaf for twelve years, and for the last year her vision had deteriorated, which fact brought her in 1893 to Hirschberg. V. with glasses R. = 15/30 and L. = 15/200. An energetic inunction course, followed by potassium iodide, was immediately undertaken, with the result that by April, 1893, the patient was apparently quite well, and even the pupils reacted well to light, which they did not do before. In 1894 the headaches returned, and inunctions were resumed. From

1893 to 1897 140 inunctions were made, and from 1897 to 1903 she was given potassium iodide continuously. The vision in 1896 was R. = 5/9 and L. = 5/20, and after that it gradually diminished on account of lens opacities. In 1903 the right lens was removed and the resulting vision with + 11.0 D. with + 1.0 cyl. 180° = 5/7, and this has remained permanently, and in view of this excellent result it was not considered necesssary to operate on the left eye. In 1905 she again had headaches and fainting fits, and was treated with mercury and potassium iodide and improved, and this recurred in 1907 and 1909, with equally good results. In September, 1909, the Wassermann reaction was tested and was found to be mildly positive—that is, forty-seven years after infection.

The second case came to Hirschberg for the first time in 1896. The patient, a girl, then 18 years of age, was suffering from interstitial keratitis, and was given thirty-five inunctions. The eye condition cleared up, the vision becoming very good. From November, 1900, to January, 1906, she had five attacks of severe persistent headache, which were cured by inunctions and potassium iodide. In January, 1906, an especially severe attack occurred which was cured only after fifty inunctions. In 1907 and in 1909 the same sequence of events was repeated. In September, 1909, the Wassermann reaction was found to be mildly positive (patient 31 years of age.) The patient married in 1901, and had one child in 1902 and another in 1907, and both children have remained up to the present perfectly healthy. A. LEVY.

(9) This paper, by **Shoemaker**, of St. Louis, Mo., occupies twenty pages. One half consists of quotations from four sources, and constitutes a kind of review of the subject of syphilis of the nervous system. The other half concerns the case-history of one patient during four years. Of the numerous symptoms which this man, aged 32, presented, the most important seems to have been that he suffered, first, from a descending optic neuritis, followed by partial atrophy and concentric contraction of the fields, and, later on, from choked discs in an early stage (relieved by treatment), which resulted in further atrophy and contraction of the fields. ERNEST THOMSON.

(10) **le Roux**, of Caen, reports a case of diphtheritic paralysis of the left external rectus, following paralysis of the soft palate. He reminds his readers that the frequency of diphtheritic paralysis is about 20 per cent., the following being the order :—palate, eye, lower limbs, upper limbs, trunk muscles. The little patient was treated with two injections of serum before the occurrence of the paralysis. The treatment afterwards was strychnine internally.

P. A. HARRY.

(11) In 1909 Barker and Hanes, of Baltimore, drew attention to the frequency of exophthalmos in chronic nephritis (see THE OPHTHALMOSCOPE, 1910, p. 284).

In the present communication **Gordinier**, of Troy, N Y., publishes observations entirely confirmatory of those expressed by Barker and Hanes. During the past year he has studied twenty-eight cases of chronic nephritis, and of that number has found that exactly one-half presented exophthalmos, together with one or more of the associated ocular manifestations, as anisocoria, von Graefe's, Stellwag's, or Mœbius's signs. Of the total number of cases (twenty-eight) all but two were instances of chronic interstitial nephritis, and of that group twelve presented exophthalmos, von Graefe's, and Stellwag's signs, while seven showed Mœbius's sign. In three cases the pupils were irregular, in five cases albuminuric retinitis was present, and in six cases there were hæmorrhages from, and arterio-sclerosis of, the retinal vessels. Tachycardia was never a prominent symptom. In no case was the thyroid gland perceptibly affected. The author finds the explanation of these symptoms in irritation of the cervical sympathetic system of fibres by toxins in the blood stream, as the result of a chronic renal insufficiency.

SYDNEY STEPHENSON.

(12) In 1904 A. W. Calhoun reported several cases of cataract in patients affected with *Uncinaria Americana*, or hook-worm disease. **F. Phinizy Calhoun,** the son of the first-named observer, now gives particulars of cataracts in two such patients, aged 20 and 26 years respectively. After removal of the lenses by discission in the first case, the optic disc of the left eye was found to be swollen and the fundus to present a few small, flame-like hæmorrhages. The author, like his father, is of opinion that cataract may be caused by hook-worm disease. SYDNEY STEPHENSON.

CORRESPONDENCE.

[While THE OPHTHALMOSCOPE will at all times welcome correspondence from its readers, the Editor does not hold himself responsible for any views expressed in this column.]

HUNTERIAN LECTURE ON COLOUR-VISION AND COLOUR-BLINDNESS.

To the Editor of THE OPHTHALMOSCOPE.

SIR,

In the current number of THE OPHTHALMOSCOPE Professor Burch states that my theory is directly in opposition to the so-called law of specific energy of the senses. I am not aware that either Bonnet or Müller dealt with colour sensation in this sense at all. Müller asserted that any stimulation of the eye would only cause a sensation of light, that of the ear a sensation of sound, and so on. Helmholtz then stated that if his theory were true, it would be a special example of the specific energy of the nerves. As far, therefore, as colour-vision is concerned, the so-called law is a hypothesis without the least evidence to support it. I am not aware of a single fact which supports this view, but everything points in an opposite direction. How, for instance, are we to reconcile this hypothesis with evolution and with the fact that a trichromic bordering on a dichromic is dichromic in unfavourable conditions of discrimination and trichromic in favourable? The telephone shows how one wire may convey all vibrations of sound, and something similar may exist for sight. There may be some limitation, as I have suggested in my book, namely, in accordance with the number of discs in the outer segments of the cones. There is nothing to show that the optic nerve cannot transmit vibrations of different wave-lengths.

I am, etc.,

F. W. EDRIDGE-GREEN.

THE INSTITUTE OF PHYSIOLOGY,
UNIVERSITY COLLEGE, LONDON.
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This instrument is now made in two forms. The usual form is too well known to need description, but the new form is made **self-registering.** It has been a matter of some difficulty to accomplish this owing to the form of the shield. A very simple method has however been adopted, which does not affect the simplicity of operation, but which automatically provides a scaled chart of the visual field up to 30°.

COLOUR PERCEPTION.

An **important improvement** has now been made in the examination for service conditions of colour perception cases. It is being realized that in these tests it is essential to use apertures which shall correspond to much greater distances than those now in use, more nearly approximating to the practical conditions. Difficulty however arises with such apertures, partly optical, and partly mechanical, owing to the extremely small apertures required to be proportional to two miles and more when testing at 6 metres. By an effective method we have succeeded in overcoming both the optical and mechanical difficulties, and are now prepared to make an instrument for use with the Edridge-Green Colour Perception Lantern, modifying the present disc of apertures so as to enable tests to be made under conditions closely approximating to a distance of two or more miles at sea.

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We beg to announce that we are opening the above premises where we shall deal exclusively with Ophthalmic Surgeons' Prescriptions.

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SMITH'S CATARACT OPERATION.

To the Editor of THE OPHTHALMOSCOPE.

SIR,

Will you very kindly allow me space to answer Dr. D. T. Vail's reply to the review of his book entitled "Smith's Cataract Operation," which review appeared over my signature in the September, 1911, number of THE OPHTHALMOSCOPE.

1. I took exception to the term "finger capillary sponge" on page 17. Dr. Vail thus defends it :—"I will say that a sponge absorbs moisture by capillary attraction, but that instead of a sponge Smith uses his finger to draw off the moisture, as he abhors sponges." The inference would appear to be that Smith's finger has the properties of a sponge; but one can hardly suppose that Dr. Vail means such a thing. Under the circumstances I still think the term inaccurate and misleading.

2. Dr. Vail takes exception to my criticism of his remarks about "the ciliary ridge" (page 50 of his book), and he now leaves no possible doubt as to his meaning. The question comes up in the discussion of a manœuvre of Smith's which I will describe in Dr. Vail's own words. After first showing how the hook is applied to the eye, it continues "Thus the eye is *dragged downwards* and the *cornea is wrinkled* in a V shape; at the same time there is a *marked gaping of the wound.* The *pull* or traction, while being *made boldly downwards* towards the patient's feet, is at the same time intelligently directed deeper at the tip of the hook toward the optic nerve, thus impinging the hook more deeply under the lens and *dimpling the vitreous* below the lens. Under these circumstances the lens *can do but one thing*, and that is to turn, etc." The italics are my own. Is it to be believed that this forcible manœuvre is effected by the tip of the hook finding its "*point d'appui*" against the soft, yielding, and comparatively lightly attached ciliary body? I must be pardoned if I, at first, hesitated to believe that Dr. Vail meant to convey such an idea to his readers. But on re-perusing pages 50 and 51 in the light of his present communication there is no other inference. Moreover, one notices that the drawings of the ciliary bodies, on page 50, are out of all proportion to the lenses in size, and that the tip of the hook is actually shown in figure 21 E pulling on this enormously exaggerated ciliary body. Your readers will readily recognise that, inasmuch as the scleral coat is incomplete at its two poles, there are *two* scleral rings, and it was obviously the anterior one, surrounding the cornea, that I referred to in my review. If any one will take a somewhat lax hollow india-rubber ball and draw a hook over its surface following the proceeding that Dr. Vail describes, he will find that he will wrinkle its coat, and obtain a hold for the hook similar to that which is obtained on the eye by this manœuvre of Smith's. In addition to this simple mechanical explanation, there are three further points which must be remembered :—*viz.*, (1) that the curvature of the eyeball makes a sudden change at the sclero-corneal margin; (2) that owing (*a*) to the presence of the section and (*b*) to the emptiness of the anterior chamber, the cornea is less firmly supported than is the adjacent sclera; and (3) that the tunics of the globe will be likely to bend *at their weakest point.* Now, according to Thomson Henderson, the sclera immediately posterior to the corneo-scleral junction is ·4 mm. thinner than the cornea at its periphery. It follows, then, that for the purposes of our argument, this will be the weakest point of the tunics; and indeed this would appear to be the point in Dr. Vail's diagram where the kink of the cornea takes place. I can again confirm this from personal experience, as I have frequently performed the manœuvres.

Furthermore, immediately behind this thin portion is the scleral spur (Arthur Thomson), which may possibly help to offer the resistance which Dr. Vail has ascribed to the soft vascular ring of ciliary processes.

It will, I think, be obvious on mechanical grounds why the hook catches where it does. On the other hand, I leave it to ophthalmologists to judge whether it is possible that the soft and comparatively feebly attached ciliary body could give the purchase Dr. Vail's suggestion demands. Even were it possible to obtain such a *point d'appui*, would any surgeon feel justified in dragging in this way on the ciliary body? Such a procedure would be a contravention of one of the canons of ophthalmic surgery. When I challenged the term "ciliary ridge" in my review, I did not believe that either Dr. Vail or Colonel Smith seriously entertained the view I have just been combating. In the light of the former's admission, I am sincerely glad that I did challenge it. It was very necessary to do so.

3. Dr. Vail at the botton of page 70 in speaking of capsule left behind states that "it *usually* thickens and becomes apparently calcified after a long time." The italics are my own. The pathology of these after-cataracts has been worked out, and it is now well known that real calcification is uncommon. In the days before accurate physical and microscopic means were at our disposal, the appearances presented probably suggested calcification to many observers. If Dr. Vail has recent evidence to upset the commonly accepted view, he has no need to use the term "*apparently* calcified." In the absence of such evidence, the term, in the light of present knowledge, is misleading. The italics are again my own.

4. Dr. Vail says "it is true that Major Elliot was at Jullundur with Dr. Vail, as he states, but it was only for three days." On reference to my diary I find that Dr. Vail has considerably understated the length of my stay at Jullundur. On questions of numerical facts, one is within one's own right in expecting him, if he commits himself to figures, at least to do so accurately.

You are aware, Sir, that the task of reviewing Dr. Vail's book was to me an uncongenial one. To me it remains an unconvincing and unscientific production, and I was bound to say so, even though by doing so I might, very much to my regret, hurt Dr. Vail's feelings. R. H. ELLIOT, Major I.M.S.

GOVERNMENT OPHTHALMIC HOSPITAL,
MADRAS, SOUTH INDIA.
November 30th, 1911.

BOOK NOTICES.

Anatomie und Histologie des menschlichen Augapfels im normalzustande, seine Entwicklung und sein Altern. (The anatomy and histology of the normal human eye, and its developmental and senile changes.)
By M. SALZMANN. Leipzig and Vienna: Franz Deuticke. 1912.

The aim of this work is to present a full, yet comparatively brief, conspectus of the normal structure of the human eye. Controversies on minute points of histology are omitted, or barely touched upon, and comparative anatomy is used only occasionally by way of illustration. The book is intended not so much for the anatomist as for the ophthalmologist who wishes to study normal histology in its bearing on the practical problems of his art. For the writing of such a book, Professor Salzmann is pre-eminently fitted by his long experience in teaching, as well as by his own researches in several branches of the subject. One finds, accordingly, throughout the monograph, a clear manner of exposition, a just discrimination and fine judgment in the sifting of conflicting opinions, and the stamp of personal observation which distinguishes a book from a compilation.

After a brief preliminary section on macroscopic anatomy and measurements, each tissue is taken up in turn and fully described. Chapters are devoted to the topography of the chambers of the eye, and to the nerve and the blood supply. The final section of the book deals with development, the eye of the newly-born, the growth of the eye after birth, and the changes which it undergoes with advancing years. On most of these subjects novel views are not to be expected, and detailed criticism would be superfluous. We should scarcely agree with the author when he says that elastic tissue is scanty at the limbus, and the statement that the canal of Schlemm contains aqueous during life will not command universal assent. Salzmann accepts the view (we think, correctly) that the dilatator and sphincter are of epiblastic origin. He expresses himself very cautiously on the opinion of Münch that chromatophores are muscle cells, and asks, not without reason, what purpose so extensive a system of muscle cells could serve in the choroid. The chapters on the retina and ciliary body are very full and good, and in dealing with the zonula, the author is, of course, on his own ground. His conclusion is that the zonula is a cuticular structure, analogous to the lens capsule and the limiting membrane of the ciliary epithelium ; considering the structural and staining peculiarities of the structure in question, this view certainly seems to have most evidence in its favour, although certain embryologists have something to say on the other side.

Finally, a word of praise is due to the great artistic merit and careful reproduction of the numerous illustrations. GEORGE COATS.

The Advance of Photography: Its History and Modern Applications.

By A. E. GARRETT, B.Sc. London: Kegan Paul, Trench, Trübner, and Co., Ltd. 1911.

The subject of photography is interesting to every ophthalmic surgeon, because the more the physiology of the eye is studied, the more closely is its association with the processes of photography recognised. This book, which is admirably written, gives a very clear account of photography from its discovery to the present date. It is written so clearly that those without a special knowledge of physics can easily understand it. There are chapters on photography in natural colours, book illustrations, astronomical photography, micro-photography, projection apparatus, Röntgen-ray photography, photo-telegraphy and animated photography. The book is very well illustrated. Facing p. 170 there is a very beautiful photograph taken with infra-red rays only. F. W. EDRIDGE-GREEN.

Le Choix des Verres et de leurs Montures en Ophthalmologie.

By DR. M. CAILLAUD. Paris: O. Doin et Fils, 8, Place de L'Odéon. 1912. Price 3 fr. 50.

This is a book of 250 pages, with 92 illustrations, many of them old friends. The author describes the whole life-history of the spectacle lens, from its origin in the glass foundry to its destination in the spectacle frame. Much space is devoted to details of the physical properties of different kinds of glass, to methods of manufacture, and particulars of workshop practice. The optical qualities of various forms of lens, spherical, cylindrical, prismatic, etc., are dealt with, and their application in the technical side of ophthalmology is discussed. There are chapters on spectacle frame fitting and face measurement, and a final one deals with the manufacture of artificial eyes.

The author makes no claim to originality. He acknowledges having gathered his material from outside, not confining himself to French sources, but having studied also the literature of England, Germany, and America. One could have wished for evidence of greater familiarity with recent English work, *e.g.*, in writing of tinted glass he deplores the variety of numeration, every optician having his own series of numbers, quite arbitrarily applied; while he entirely ignores the work in this direction recently done by the English Optical Society, in conjunction with the National Physical Laboratory. Indeed, a search through the somewhat extensive bibliography reveals only one English name, and that appears as "*Percival de New York.*" This, with an allusion in the text to "*la moison Sutcliffe*," may be taken as an indication of the extent of the writer's knowledge of things English.

Nothing in the book specially calls for comment. On the whole, it may be taken as not without merit if regarded as a channel of interesting information upon subjects connected with spectacle lenses, but it cannot be accepted as a satisfactory text-book for the guidance of practical men. It contains several inaccuracies, has serious omissions, and many of the workshop methods described belong to a former generation, and in this country at least have long been superseded. It may seem undesirable to judge the book on this plane, but its author's claim that it contains all that is necessary to the optician (*tout ce qu'il doit savoir*) justifies, and, indeed, demands a high standard of judgment. From this point of view it must be regarded as inadequate, and as comparing unfavourably with similar English works. There is more practical information in 25 pages of such a book as Silvanus Thompson's "*Optical Data*," than in the whole 250 pages of Dr. Caillaud's work.

W. A. D.

NOTES AND ECHOES.

Appointments.

MR. J. STROUD HOSFORD has been appointed surgeon to the Royal Eye Hospital, Southwark, London.

Mr. Charles Adair-Dighton has been appointed ophthalmic surgeon to the Birkenhead and Wirral Children's Infirmary.

Mr. James Cole Marshall has been appointed ophthalmic surgeon to the Royal Waterloo Hospital for Children and Women, London.

Mr. William Wilson has been appointed assistant ophthalmic and aural surgeon to the Royal Infirmary, Wigan.

Mr. T. W. Letchworth has been appointed ophthalmic surgeon to the Tottenham Education Committee.

Mr. H. St. Clair Roberts has been appointed surgeon to the Worcester Ophthalmic Hospital.

* * * *

L'Académie de Médecine.

THE Annual Award of prizes by the French Academy of Medicine was made on December 12th last. The *Prix Meynot* of 2,600 francs was awarded to Dr. Etienne Ginestous, ophthalmic surgeon to the Bordeaux Suburban Hospital. Honourable mention was accorded to Dr. Jacques Mawas, of Lyons, Dr. A. Monthus, of Paris, Dr. Opin, of Toulon, and Surgeon-Major Henri Spindler.

* * * *

Paris Eye Cliniques.

NO apology need be made for quoting the following interesting remarks from the *British Medical Journal* of December 23rd, 1911:

> "Practically every general hospital in Paris has its eye department, and besides this there are eye infirmaries. To the Quinze-Vingts Hospital, which is the national eye hospital in France, cases are sent from all parts of France; it has three or four dispensaries for outdoor patients, which may be visited by any stranger, and the number and variety of cases seen in an afternoon will amply repay the visitor. Operations also take place every afternoon, and all that the visitor requires to do is to present his card, and immediately he is shown into the theatre and can watch all that is going on. It is here that Dr. Kalt operates, and his cataract operation with the corneal stitch, if once seen, will never be forgotten; and after having been seen, may possibly be adopted later with advantage. At Rothschild's Eye Hospital the outdoor dispensary attendance is enormous; operations take place in the forenoons. This hospital is a model as regards modern installation and general outfit. At Dr. Landolt's private clinic in rue St. André des Arts, operations are performed on Wednesdays and Saturdays at 12.30 p.m. The most important feature of this clinic is the work on strabismus and muscular advancement, though all branches of ophthalmology receive attention. Each case of strabismus is gone into so thoroughly, and the methods of diagnosis so clearly explained and demonstrated, that any one present has the satisfaction not only of seeing a correct diagnosis being made, but also of noting how the conclusion was drawn, and why each test is applied. At the eye clinic of Dr. Morax at Larisboisière Hospital, operations and dispensary work may be seen every morning. The plastic work done here is of the first order, and other operative work is equally good. Special courses in the bacteriology of the eye are held, and are very valuable, since Dr. Morax is a high authority on the subject. Amongst eye clinics at other hospitals may be mentioned Hôtel-Dieu, where Professor Lapersonne attends daily at 9 a.m., and the Enfants-Malades, where Dr. Terrien attends daily at 2 p.m."

* * * *

Continental Items.

ACCORDING to a recent issue of the *Wochenschrift für Therapie und Hygiene des Auges* (January 4th, 1912), the vacancy at Breslau, created by the appointment of Professor Uhthoff to the Berlin chair of ophthalmology, has been offered to Professor Axenfeld, of Freiburg i. Br. The *Wochenschrift*, however, then goes on to add that, according to later information, Uhthoff has declined the Berlin chair. In a more recent issue (January 18th, 1912), it is stated that the Berlin vacancy has been offered to Professor Carl Hess, at present of Würzburg, and more recently still (January 25th, 1912) has been declined by him. This Berlin business reminds one of nothing so much as of a game of "General Post."

* * * *

British Medical Association.

THE next annual meeting at the British Medical Association will be held at Liverpool towards the end of next July. Sectional meetings take place on July 24th, 25th, and 26th. The following are the officers of the Section of Ophthalmology :—President : Edgar Athelstane Browne, Liverpool. Vice-Presidents : Charles George Lee, Liverpool ; Alexander Ogilvy, Clifton, Bristol ; Andrew Maitland Ramsay, Glasgow ; Charles Hartley Bedwell Shears, Liverpool. Honorary Secretaries : Arthur Nimmo Walker, 45, Rodney Street, Liverpool ; Robert Jessop Hamilton, 82, Rodney Street, Liverpool ; Claude Alley Worth, 138, Harley Street, London, W.

* * * *

Sir James Mackenzie Davidson.

CONGRATULATIONS to Mackenzie Davidson, whose name figured in the New Year Honours List. It will be remembered that several years ago Sir James M. Davidson relinquished the professorship of ophthalmology in the University of Aberdeen to study the then recently discovered X-rays. His work in that direction, and more recently with radium, is known to every reader of THE OPHTHALMOSCOPE.

* * * *

Moorfields Hospital.

THE sixth annual dinner of students, past and present, of the Royal London Ophthalmic Hospital will be held at 8 o'clock on Wednesday, February 7th, at the Imperial Restaurant, Regent Street, W. Mr. F. R. Cross, of Clifton, Bristol, will preside. Tickets (10s. 6d. each, exclusive of wine) from the honorary secretaries, Mr. Arnold Lawson and Mr. J. H. Parsons.

* * * *

The University of Colorado.

THE first Course on Ophthalmology to be given by the University of Colorado, in Denver, will begin June 23rd, and extend to August 2nd, 1912. The instruction will be open to all graduates of accredited medical colleges. But those desiring to take a degree will be required to show one year of work in an eye clinic, besides a certain amount of mathematics and physical optics, an acquaintance with the literature of ophthalmology, and to pass an examination.

THE OPHTHALMOSCOPE.

A MONTHLY REVIEW OF CURRENT OPHTHALMOLOGY.

VOL. X.—NO. 3.] MARCH 1, 1912. [TWO SHILLINGS.

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ORIGINAL COMMUNICATIONS.

OCULAR MUSCLE BALANCE*

BY
ERNEST E. MADDOX, M.D., F.R.C.S.Ed.
BOURNEMOUTH, ENGLAND.

Introduction.

THE perfect concert of the two eyes, by which we see single, and to which the eyes owe their look of mutual understanding, is so largely maintained by habit, that were one eye to become suddenly blind it would still appear to an ordinary observer to follow every movement of the other with unerring fidelity. In reality, however, an invisible deflection of the visual line does take place, minute in some cases, more considerable in others, showing that the "balance of the eyes" as it is often called, is not perfect. The term "muscle balance," it may be explained, though not a very accurate expression, is commonly retained amongst us as being the Anglo-Saxon equivalent of the classical "*Muskelequilibrium*" of that prince of ophthalmologists, von Graefe.

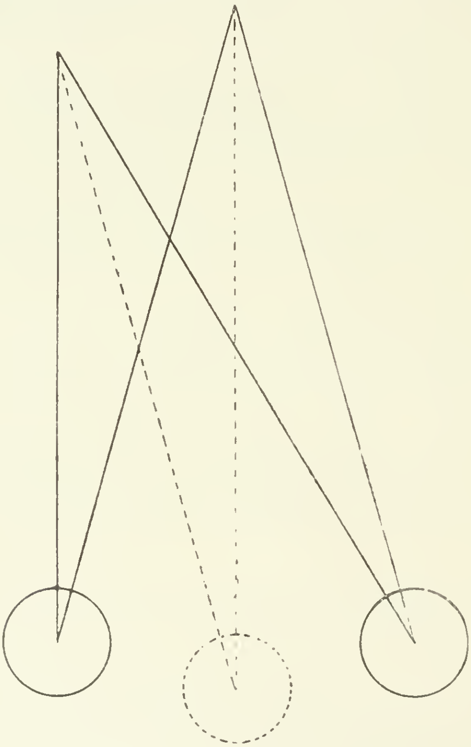

FIG. I.—To illustrate Hering's "*Doppelauge.*" From "*Die Lehre vom Binocularen Sehen*" § 4.

Innervations.

The balance of the eyes is maintained by their conjugate innervations, which were formerly computed as six, though twelve seems rather the more likely number, and I would submit that it is essential for an understanding of the ocular motions, to divide these innervations into two crisply distinguished classes, neither of which attempts to fulfil, in the slightest degree, the function of the other. The first class unifies the two eyes, the second directs them. Herein lies the simple explanation of many otherwise strange phenomena, such as the totally different behaviour of "false torsion" and "Meissner's torsion" to be discussed later.

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*Two lectures delivered in the Course for the Diploma in Ophthalmology of the University of Oxford, 1911.

The *first class* of the purely oculo-motor innervations exists to preserve the integrity of the Cyclopian or binocular eye,—that is to say, the "*Doppelauge*," or mental eye, of Hering, but it has nothing to do with the direction in which this unified eye looks. In a theoretically perfect pair of eyes, the Cyclopian or virtual eye, lies precisely in the median plane of the head, slightly behind the actual eyes. This was figured by Hering (see Fig. 1), and magnificently worked out in more detail, much later, by Le Conte. We may distinguish the motions of the eyeballs actuated by innervations of this first class, as contrary motions, since they all move the eyes in opposite directions, that is, either towards, or away from, one another.

The *second class* of innervations presides over the *parallel* motions of the eyes, including in that term not only the parallel motions of the two visual axes, but also the parallel torsions of the two eyes about those axes, since we need not only the help of the former to locate the *direction* of objects in space, but also of the latter, to keep the eyes true for learning the relation of the same objects to the vertical.

In my accompanying table of these two classes of innervations, I have preferred to use the word "kingdoms" to bring out more emphatically the difference of their laws. It is not an unfamiliar thought for different kingdoms to have greatly different laws. For example, the torsion brought about under kingdom I behaves entirely differently from that in kingdom II, and gives us no information about the erectness of objects, as the latter does. Indeed, kingdom I has no power to tell us anything relating to the position or attitude of objects in space, while conversely kingdom II has no power to correct any kind of diplopia.

Scheme of twelve Binocular Innervations.

KINGDOM I. FOR CREATING THE BINOCULAR EYE.

Contrary	Horizontal	1. Convergence. 2. Divergence.
	Vertical	3. R Relative elevation over L. 4. L Relative elevation over R.
	Torsional	5. Binocular intorsion. 6. Binocular extorsion.

KINGDOM II. FOR DIRECTING THE BINOCULAR EYE.

Parallel	Horizontal	7. Binocular dextroduction. 8. Binocular lævoduction.
	Vertical	9. Binocular elevation. 10. Binocular depression.
	Torsional	11. Binocular dextrotorsion. 12. Binocular lævotorsion.

Innervations 1 and 2 of the first kingdom preserve us from horizontal diplopia, and also tell us the distance of objects, but they have nothing to say about their direction in space.

Those numbered 3 and 4 preserve each visual line from rising higher than the other, and of these we know least. One of them is actuated when we place a vertical prism before either eye. I can only assume their conjugate character from analogy with all the others, so their existence at present is only presumptive.

Innervations 5 and 6 are charged with the duty of keeping the prime retinal meridians functionally parallel with each other. One approximates these meridians above, and the other below, so as to effect respectively binocular intorsion and binocular extorsion.

Of the above innervations, two only, *viz.*, the first and second, have any link with accommodation, or with volition, though all are probably governed by the same kind of visual-reflex to effect fusion.

In kingdom II, innervations 7 and 8 control the parallel motions of the visual lines to right and left respectively, while 9 turns both eyes upwards and 10 both downwards. It is by our keen appreciation of these four well-known innervations that retinal images are projected along their true direction in space. When we see a bird, it is not exactly the bird that we see, but an image of it, which the brain has projected with such fidelity as to occupy the same position in space as the bird which gave rise to the image. The slightest defect in the mechanism involved would make the image no longer coincide with the bird. Projection of this nature is entirely foreign to the first kingdom. From the fact that paresis of an ocular muscle diverts the image by a degree proportional to the paresis, we may gather that our sense of the position of the eyeballs is not gained from any afferent message originated in the muscles, but is due to consciousness of the exact output of central energy in connection with this second innervational kingdom. Sherrington's observation that the eye muscles contain simpler spindle organs than other skeletal muscles, becomes therefore of great interest.

Innervations 11 and 12 have for long been of special interest to me, since I think they may account for the want of permanence in the correction of some of our cases of astigmatism. They roll both eyes simultaneously in the same direction about their visual lines—one rolling them both to the right, and the other both to the left. I have gained an impression from clinical experience that in the course of years one innervation may in rare cases, by slightly preponderating over the other, create a slow torsional displacement of the two eyes, to follow which the axes of the cylinders require displacing in parallel directions.

There is, of course, nothing in the law of corresponding points to act as an anchor to prevent innervations, which preside over *parallel* torsion, from preponderating one over the other, but whether slow displacements may be similarly produced by innervations 5 and 6, I have only suspected and not yet been able to prove. It is just possible such may occur, since points in the two retinæ (other than the foveæ) which are corresponding at one time are not necessarily so a few years later. The mind may, for all we know, very quickly learn to adapt itself to a new set of corresponding points, provided these are produced only by torsion of the eye, since there is no great superiority of one retinal diameter over another, to compare with that of the macula over the rest. I must try to investigate this point more closely.

It is by the innervations 11 and 12 of parallel torsion that we alone judge whether a line is erect, or what the inclination of objects from the vertical may be. The actual physical torsion of an eye may be brought about partly by one of these and partly by innervations 5 or 6 of the first kingdom, the two working together, but the mind estimates erectness by the former factor only, ignoring the latter. Whenever the two kingdoms work together in one eye they work against one another in the other eye.

The twelve extra-ocular muscles, under the guidance of these twelve binocular innervations (if I am right as to their number)* make the two eyes work together as if they were one.

In speaking of the innervations of the eyes, it is necessary to be guarded against supposing that their conjugate character is entirely anatomical in origin. Though it is generally stated that each innervation transmits equal impulses to the two eyes, that view may have to be modified. There exists a very strong tendency in nature for muscle defects which are in the first place incomitant, to become, in course of time, concomitant as far as they possibly can. For this to be the case, a conjugate innervation must send stronger impulses to one eye than to the other in proportion to the difference in strength of the muscles employed. It would perhaps therefore, be truer to say that each conjugate innervation tends in time to divide its neuro-muscular energy equally between the two eyes.

Influence of Fusion.

Let us now enquire what happens to an eye when it is covered by the hand. Sudden unscreening will best answer that question. Eyes are considered to be well balanced when their pose with relation to each other is but inconsiderably affected by such an act, but should the released eye be detected bounding into its place again, it has clearly been a truant The rectification is due to "nature's love of single vision," or as the German physiologists called it, the faculty of "fusion,' whose function it is to fuse the two fields of vision into one.

The greater the deviation of the eye, the greater is the demand upon this faculty, which being of the nature of a "visual reflex,' is more prone to fatigue than the mere association of innervations which habitually synchronize in the daily visual acts of life. Herein, you will agree, lies probably the explanation of headaches from latent deviations. There is a great economy of reflex energy when innervations which habitually work in company are braced together like greyhounds. An illustration in the domain of the muscular system, is found in the fibrous slip which mechanically unites the superior rectus and the levator palpebræ, which always act in unison ; and in the connection between certain of the extensor tendons of the hand.

That muscular work performed exclusively by association of innervations is comparatively tireless, is shown by the fact that the internal rectus of a highly squinting eye, never causes an ache or becomes tired, though it is in perpetual active contraction from association with accommodation. A simple way to put it, is that the eyes are provided with two adjustments, a coarse and a fine. The coarse adjustment is by cerebral association of all those innervations which habitually work together, whereas the fine adjustment is by a complex visual reflex action already mentioned, which requires a far greater exercise of office-work, in specialized brain cells.

It will readily be understood therefore, that the more effective the coarse adjustment and thus the smaller the demand upon this visual reflex, the less is the liability to ocular fatigue.

Our higher consciousness is quite unable to distinguish to which eye each image belongs, in diplopia, but there is no hesitation or doubt in the fusion apparatus, even though vision be instantaneous, as by a flash of lightning, hence no time is lost in bringing into play the appropriate muscles for the correction of diplopia.

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*In the first edition (1898) of a book on Ocular Muscles, I only enumerated ten : in the second edition, twelve.

Appliances.

The object of all tests which dissociate the eyes is to find out what proportion of work is performed respectively by these two adjustments. Any smaller wandering than five degree under a screen generally escapes detection by a non-expert observer; yet deviations smaller than this are often sufficient to cause considerable trouble.

Instead of observing the patient's eye ourselves, we may, like Alfred Graefe, appeal to the patient's subjective sensations. If he be very much on the alert he may detect an instantaneous diplopia, which immediately obliterates itself. But here again the mind is accustomed, for the sake of its own peace, to ignore the occurrence of diplopia of this kind, since it often occurs spontaneously when ordinary objects interfere temporarily with the vision of one eye so as to cause inadvertent monocular occlusion. Prisms, again, only estimate the balance when both eyes are seeing.

An appliance, therefore, seemed necessary for discovering the position of a darkened eye, and such an one occurred now long ago to a medical student, possssed with the curiosity of youth, to learn what happened to an eye when placed subjectively in the dark. Both eyes look into a dark box, and are engaged with a tiny window in the middle of its far end, or on occasion, with a distant object seen through the same window. Another minute window is then allowed to throw its light upon the blind spot of one eye, whereupon the vision of the first window is cut off by an invisible screen from that eye, which now therefore is excluded entirely from vision, for the entrance of the optic nerve is so blind that, even when a strong light is concentrated upon it, there is no sensation of light. Suddenly, however, this window springs into view, showing that the darkened eye has moved. By displacing the image of the window on the disc in opposite directions until it just becomes visible on either side of the blind spot, the new position of the eye can be ascertained.*

I will not dwell upon the experiments possible with this apparatus, which are now of little more than physiological interest. It established the fact that an eye when placed subjectively in the dark behaves exactly as it does when artificially dissociated in the light.

A means of dissociation in the light had been previously employed by von Graefe in the shape of a prism so held before one eye as to displace upwards the image which belonged to it, or else to displace it outwards to such an extent that any diverging effort in the interests of fusion was surrendered as hopeless. The eyes then fell into the same relative position as if one were covered by the hand provided there were no lines or linear edges of objects sufficiently long or overlapping to tempt the subconscious mind to treat them as double images and run them into one. Strangely enough von Graefe overlooked this proviso and actually drew a vertical line through a dot in order to reduplicate both by an erect prism. Naturally, though the dot was reduplicated, the line was only elongated and except in strongly pronounced defects, the desire to keep the elongated line from separating into two, sufficed to maintain the straightness of the eyes.

That in spite of this von Graefe was fully alive to the frequent occurrence of latent deviations, is manifested by his care to guard against being deceived by them in testing for ocular paralysis. His advice, strongly seconded by Mauthner, of Vienna, was to ignore till later in the testing, the horizontal and torsional elements in the false image while testing for the vertically acting muscles, and confine the first attention entirely to the vertical separation between the images.

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*This apparatus was shown to the Ophthalmological Society in 1883.

The setting of von Graefe's prism requires the greatest care. Unless held absolutely erect while testing for horizontal deviations and absolutely horizontal in testing for vertical ones, any appearance of deviation may easily be an artefact, so that some improvement on von Graefe's prism seemed needed. Curiously enough this was effected in England by doubling it, and in America by dividing it into two halves. By adding a second prism with its edge down to von Graefe's prism with its edge up, and grinding the combination out of one piece of glass, my bi-prism which I here show you, was produced. The inferior prism caused a second image to lie immediately beneath the other when the prism was held truly; so any departure from accuracy caused one image to move as much to the right as the other to the left. Since it is easy to imagine a straight line between the images, the error incidental to von Graefe's single prism was eliminated.

The American improvement was introduced by Dr. Stevens of New York, who ingeniously divided von Graefe's prism into two and geared the two halves together by means of cogwheels, so that latent deviations could be not only detected, but measured by the degree of rotation imparted to the prisms. This was the first phorometer.

Another test, which I introduced about the same time, was to replace von Graefe's dot with a line through it, by a tangent scale, from the zero of which a vertical arrow was erected, short enough to avoid overlapping of its two images when viewed with von Graefe's erect prism before the one eye, the figure in the upper of the reduplicated scales, *viz.*, that to which the lower arrow points, tells the deviation at once in angular measurement.*

Convenient mounts for this test have been made of late years by opticians, von Graefe's prism being divided equally between the two eyes, but after all, a single card with a square prism is more portable and takes less space in the working corner of an ophthalmologist's room. The card may be furnished with a string of the correct length to maintain the proper distance from the eyes, and is supplied by Curry and Paxton.

We now come to another kind of test which does not, like those just described, depend on separation of two similar images, but alters the shape of one of them to such an extent as to make it unrecognizable by the mind as being an image of the same object. The glass rod test was the first of these and was suggested by noticing a faint line of light which appeared to connect the two images of a flame looked at through the bi-prism. Such a rod elongates the image of a flame into a line of light and the test possesses the advantage that slight inaccuracies in the position of the rod do not materially affect its efficiency, for though the line of light may appear to slant a little, it is just as easy to say on which side of the flame it passes. For convenience, a row of glass rods are fixed together against an aperture in a vulcanite disc. To whichever side of the flame the streak lies, the eye which sees it deviates in the opposite direction, and the prism held before the glass rods, which brings the line of light to pass through the flame, is the measure of the deviation. For horizontal deviations the glass rods should be held horizontally, so as to cause a vertical streak, but for vertical deviations the rods should be vertical so as to produce a horizontal streak. To facilitate measurement a variable prism can be placed before the uncovered eye, or better still a double tangent scale upon the wall, with a light at its centre, can be employed, so that the degree of deviation can be read off by the patient. Such a scale has long been made for me by Curry and Paxton, and also a vertical scale for vertical deviations. The use of this test is facilitated by partially darkening the room or by the use of a dark background behind the lamp, as also by making the rods of red glass, and mounting them on one side of an ordinary cataract frame, the other eye of which is glazed with green glass.

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* Since giving these lectures, the "reduplicated tangent scale test" has been improved. The needless false images have been blotted out by means of neutralizing colours, after the principle of Snellen's "Friend" test. By turning the scale to the vertical, hyperphoria in near vision can also be measured. Messrs. Raphael of Hatton Garden, who have made this new instrument for me, suggested mounting the scale on a rotating disc. With care to use appropriate light, the prism can be dispensed with, so as to utilize Snellen's principle only, and rotation of the disc then enables cyclophoria to be approximately measured at the same time.

Should there be any suspicion that in spite of the dissimilarity of the images, the mind makes some slight attempt to unite them, the glass rods, while in position, should be screened with a visiting card, and the patient be instructed to state the position of the red streak at the first instant of its appearance following the sudden withdrawal of the card. In this way we really discover the position of an eye excluded from vision. Reber suggests twisting the line through 90° and then suddenly restoring to its original position.

Two modifications of this test have been made. (1) By Dr. Stevens, who converted the cylinder into a sphere, mounted on a vulcanite disc with a very small central aperture. This expands the false image into a disc of light, in some part of which the true image is seen to lie. (2) By Prof. Rogers, who employs a cone of glass instead of a sphere, and converts one image into a ring of light resembling a child's hoop in shape, within which ring the true image is seen. But, in practice, neither of these appear to be quite so handy as their original.

Of the numerous other modes of producing dissociation, and measuring the muscle balance, I will only call your attention to one, which requires no apparatus. If a visiting card or envelope be held with its upper edge coincident with the horizontal diameter of one pupil, and another with its lower edge coinciding with that of the other pupil, any vertical line looked at, such as the cord of a window blind, will at once manifest any latent deviation, by the upper half of the cord appearing displaced from the lower in proportion thereto. You can indeed make this test with your fingers only. For vertical diplopia a single piece of paper suffices, held vertically between the two eyes in the manner which I show you, while a horizontal line is regarded.

M. Remy's diploscope and Mr. Bishop Harman's very practical modification of it, you will no doubt learn from the authors of these tests themselves, in the coming Congress. Harman's diaphragm test is an excellent test for near vision, especially with children, but it needs supplementing by a distant vision test, just as we should not measure refraction in near vision only.

Tests for Paresis.

It is important to discover whether heterophoria be paretic or concomitant. This can easily be ascertained by repeating its measurement with the head placed in different positions, one position being selected to make the least call, and another to make the greatest call, upon the action of the suspected muscle. In hyperphoria, for example, the chin should first be elevated and then depressed. Secondly, there should be added to the one of these attitudes which gives the greatest diplopia, a rotation of the head to right and to left, to locate the maximum vertical diplopia. In horizontal heterophoria the face should be turned first to one side and then to the other. Should the measure of the deviation remain unchanged by these procedures, it is concomitant. Should it prove to be paretic, the affected muscle can be easily diagnosed by the relative vertical separation of the images to right and left, after the principle introduced by von Graefe, and described with some expansion in my book on the Ocular Muscles.

Breadth of Fusion.

Having measured the balance of the eyes, the next tests to institute are those which measure the *breadth of fusion.* The difference between latent deviations and some kinds of manifest squint is merely one of degree. The moment a deviation becomes greater than the breadth of fusion, the eye escapes into a manifest squint. It stands to reason therefore, that there must be borderland cases in which the fusion faculty is only just able, by the greatest effort, to hold its own. The difficulty may spring, either from the breadth of fusion power being small, or from the deviation being great, nor is it surprising that headache should occur under either condition.

It is important, therefore, to ascertain what reserve of fusion power is possessed by the eyes and this used to be investigated by holding a succession of prisms before the eyes, of increasing strength, until the highest is found which could be overcome. Since it is an easier task for the eyes to *maintain* the fusion of two images than it is to bring them together when once separated, we obtain rather inferior results from such a succession of single prisms than we do from combinations of prisms which enable a *gradually* increased fusion power to be exerted.

Of the latter, the monocular class is represented by Herschell's variable prisms, mounted in various ways by Landolt, Risley, Jackson and others and which are held before one eye. A binocular kind is represented by the ' prism-verger," which I show you, and which divides the prismatic effect equally between the two eyes. The advantage of this is that the prismatic chromatism and metamorphopsia being equally shared by the two images, there is not the same interference with the desire to unite them that comes into play when all the chromatism and distortion is imparted to one image. The important point in the use of the " prism-verger " is to hold it immovably upon the face and let the rotation of the prisms be smooth.

I have graduated the instrument for degrees of deviation, but it is quite as easy to graduate it in centrads for those who wish. For ordinary clinical work it suffices to reckon the value of a metre angle to be $3\frac{1}{2}°$ or $4°$. The former if the distance between the eyes be smaller than usual, and the latter if it be greater. The metre angle is of course a unit which has a different angular value in different people, since when the visual lines intersect at the distance of a metre, the angle between them depends on the distance between the centres of motion of the two eyes. This makes the metre angle unsuitable for graduating this prism-verger directly.

For accurate *physiological* investigations as distinguished from clinical, the instrument should be mounted on a rigid stand, against which the patient's face is applied, and allowance should be made for the difference between the deviation of light by a prism and the deviation of the eyeball by the same prism, for which correction I have given rules elsewhere. Moreover, the graduation for the horizontal component of the prisms should be in sine centunes. A little explanation of this unit may be necessary, since it is the only accurate one for the measurement of convergence. It is a deviation of 1 cm. at the distance of a metre, the centimetre being measured on the sine of the angle, in contrast with the prism-dioptre, which is measured along the tangent, and the centrad, which is measured on the arc. The two latter units have been recognized previously, and were introduced by Prentice and Dennett respectively. To give these units a proper classification and show their relation to each other, I have suggested the name centune to include every centimetre-per-metre deviation, naming it tangent centune when measured along the tangent, arc centune when measured along the arc and sine centune when measured along the sine.

It is not easy to draw up a table of the physiological breadth of fusion, since it not only varies with the will-power exerted, but practice so readily enables it to be extended. After allowing for these sources of error, there belongs to every output of accommodation, or distance of vision, a distinct and different breadth of fusion, the negative part of which is known as prism-divergence, and the positive part as prism-convergence for that distance. With negative accommodation, the physiological amount of prism-divergence is 4° (as first stated by Stevens), that is 2° for each eye, estimated of course, in degrees of deviation. This is almost the only definite figure that has been given yet, observers differing greatly about the others, but I hope in time the prism-verger will allow a sufficient number of observations to be collected to form a reliable average for the other quantities.

Chart Making.

I should now like to make very clear to you the relation which exists between relative accommodation as first investigated by Donders, and relative convergence, which latter is identical with "breadth of fusion."

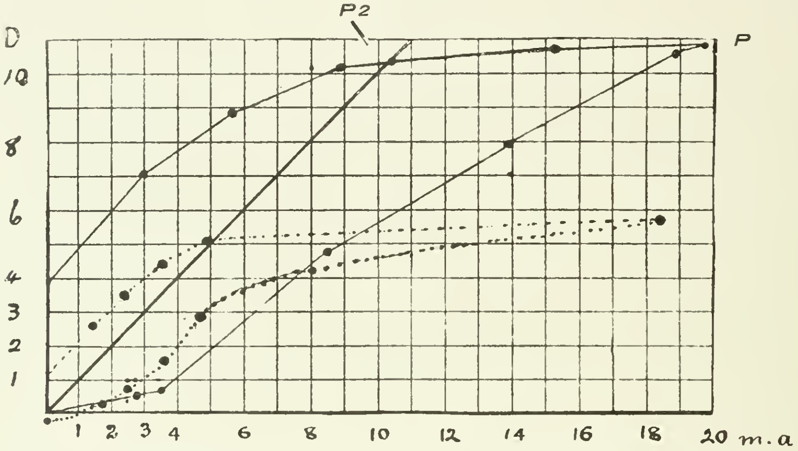


FIG. 2.—Continuous curve represents age 15, and the dotted curve age 44, both from Donders but converted into Nagel's Notation.

This diagram combines in one, two of the charts made by Donders to show the relative accommodation incidental to different periods of life. The coördinates however are drawn to represent dioptres and metre angles after Nagel's method instead of the inch reciprocals employed by Donders. Of the two coördinate axes the vertical one is marked in dioptres, and the horizontal one in metre angles, while the diagonal line drawn from their origin midway between them represents an equal increase of convergence and accommodation such as takes place in ordinary binocular vision. For each selected point on this diagonal line, *relative accommodation* is measured upwards and downwards for the positive and negative parts respectively of its range; and *relative convergence* is measured horizontally to right and to left, for the positive and negative parts respectively of the "breadth of fusion," or "range of relative convergence." Let us consider the continuous curves first, neglecting the dotted ones.

Since accommodation is measured by ordinates, and convergence by abscissæ, it is evident at a glance that the maximum attainable convergence is much greater than the maximum attainable accommodation, for the horizontal distance of the point *p.* exceeds its vertical distance from the "origin." The ordinates of the lower curve are the minima of relative accommodation, and those of the upper curve its maxima, for each fixed degree of convergence. The differences between these ordinates, or, in other words, the vertical intercepts between the two curves, measure the ranges of relative accommodation for each fixed degree of convergence. Since the diagonal line represents simultaneous convergence and accommodation for the same points, its ordinates being always equal to its abscissæ, that part of each intercept which lies above the diagonal measures the excess of accommodation over convergence, that is to say, the positive part of the range of accommodation, while the portion of the intercept below the diagonal is the negative part of the same range. The positive part is, in practice, measured by finding the concave lenses that can be worn without impairing the definition of fine print which has been fixedly placed at the distance indicated by any chosen number of metre angles, that is to say, by any chosen abscissa. The lower curve is therefore the locus of the far point of relative accommodation, and the upper curve that of its near point. On approaching the point, P^2, which is the binocular near point, the positive part of the range dwindles, and finally vanishes at that point, showing that no longer can even the feeblest concave lens be overcome. The diagonal need not be continued beyond this point, because beyond it convergence and accommodation for the same point are impossible. It is true that by squinting, and thus greatly increasing the convergence, a little more accommodation can be effected, as shown by the continuation of the upper curve, which rises a little as it travels to the right until the maximum monocular near point is reached at p, which is also the absolute near point of convergence.

A glance at the dotted curves for the age of 44 shows at once how much more narrow is the area they enclose, though its length remains much the same. The shortening of the vertical intercepts shows clearly how the relative accommodation becomes curtailed as years advance, though the total converging power is but little affected by age, while the horizontal intercepts show how much less relative convergence is affected than relative accommodation.

For the entry of results obtained by clinical tests at six metres, and at a third of a metre, in the absence of squared paper, I find it answers very well for the case book to draw a faint square with a diagonal from the lower left-hand corner to the opposite one, remembering that the lower extremity or "origin" of the diagonal represents infinity, while its upper extremity represents the usual reading distance. From each of these two points vertical and horizontal lines are drawn proportional in length to the ranges of relative A and C. We really do not need to work them out for intermediate distances. Thus one bold horizontal line drawn through the "origin," and another through the upper extremity of the diagonal, represent the breadth of fusion for distance and near vision respectively, the right-hand segment of each horizontal line representing the prism-convergence, and the left-hand segment, the prism-divergence. Vertical lines through the same points may show the relative accommodation. An interrupted line to represent in each case the balance of the eyes, as found by the glass rod for six metres, and by the tangent scale for reading distance, completes the little design for the case book. In practice it will rarely be required to work out more than some of these data.

The middle third of the breadth of fusion has been called by Percival the "area of repose," since he assumes that fusion is more comfortable when one portion of the range has less than twice the dimensions of the other. This, I believe, is chiefly true in near vision, since in distant vision it is not uncommon for one side of the range to be several times greater than the other without symptoms.

Though we cannot by lenses or prisms alter the "range" of either accommodation or convergence, since that means their dimensions, we *can* alter what Donders called their "region." For example, by prescribing a prism of

1° 50′, edge in, for each eye, the patient starts with one m.a. of convergence in distant vision, just as a hypermetrope of 1 D or a wearer of —1 D lenses, starts with one dioptre of accommodation ; and just also as the hypermetrope suffers proportionate recession of his near point of accommodation, so the positive side of the range of relative convergence is lessened by one metre angle, and the negative side of the range increased to the same amount. Prisms edge-in therefore, virtually carry the zero line of convergence to the right. The same prisms, edge out, would have the opposite effect ; *i.e.*, in distant vision, their wearer would start with divergence of one m.a. so that the negative portion of his range of relative convergence is lessened and the positive portion increased. It is as though the same vertical zero line were carried to the left.

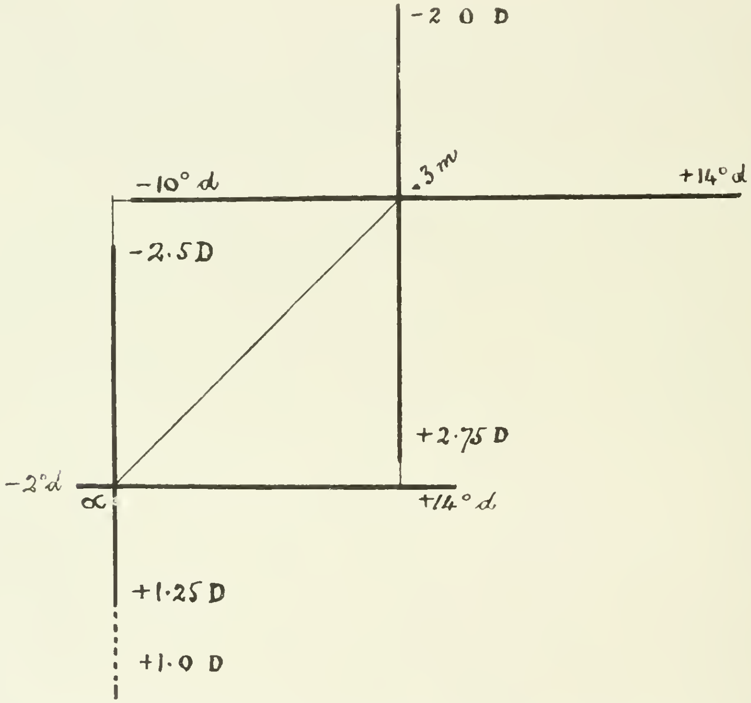


Fig. 3.—Mode of entry in case book. The bold vertical lines show relative range of accommodation for far and reading distance respectively, the dotted extremity of the first showing latent H ; total H in this case being 2.25 D. The bold horizontal lines represent relative range of convergence for far and reading distance respectively.

In practice it is far better to adjust the balance by lenses than by prisms. Lenses of + 1 D for example, in hypermetropia would virtually displace the lower horizontal lines of the diagram downwards by the same amount that the already-described adducting prisms displace the vertical lines sideways, while lenses of —1. D would displace the horizontal lines upwards. Percival's rule that the diagonal should lie in the middle third of the range of relative convergence can thus if desired be complied with and the displacement of the diagonal is the same, whether it be effected by lenses or by prisms.

In theory all this works out very beautifully, but in practice there are many defects due to the personal equation of each patient and the extremely various answers which one may give at different times. Still, these defects are only questions of degree, since in a minor form they beset every department of refraction work; Percival's rule is probably the best that has been made yet in this connection for those who work by rules.

Varieties of Muscle Balance.

Let us now consider in detail defects of balance as discovered by rod tests, phorometers, etc.

It is convenient to employ the term heterophoria, introduced by Stevens for all latent departures from perfect balance. Esophoria inwards, exophoria outwards, hyperphoria one eye higher than the other. Cyclophoria (a name given by Savage and Price) we shall consider presently.

Before proceeding further, an important point needs some notice. In distant vision there is a strong tendency for the eyes to remain approximately parallel even in the presence of hypermetropia, with or without correcting lenses. For all distances of vision the effect of either plus or minus lenses on the convergence, differs from what would be theoretically expected, owing to the conscious sense of the true distance, which introduces a modifying factor. Convergence is influenced by this psychical state as well as by its relation to accommodation. Latent deviations, however always mean something, and when they are other than trivial we should always seek to interpret their existence.

Esophoria is generally due to latent hypermetropia. When in near vision only, it is certainly due to that, or to some defect of accommodation, which may be cycloplegic in young people, or presbyopic in the elderly. In distant vision it may be due to weakness of the diverging innervation, or to excessive tonus in the converging centre, as from the exercise of excessive convergence in myopes, when reading.

Its treatment, except in the myopic kind, is by convex lenses, either for distance or near, as the case requires. Should this not suffice, the diverging faculty may be exercised by training prisms, edge outwards, mounted in a spectacle frame. The patient should, with these, fix some near object attentively, and slowly recede from it until diplopia threatens, there remaining until a still further recession is possible. If this be done every day, as suggested by Gould, at a time when the bodily powers are at their best, the diverging function will be strengthened.

Instead of going to the expense of prescribing stronger and stronger prisms as treatment progresses, I have devised the plan of commencing with two strong prisms to begin with, the apices of which are turned upwards and sufficiently outwards to have the joint effect of weak diverging prisms. These are mounted in ordinary circular-eyed spectacles, preferably with thumb screws. The vertical components of these prisms simply raise both eyes equally, leaving the horizontal components to effect the training. By rotating their apices further outward on each visit they have the effect of stronger horizontal prisms. Still better, the prism-verger may be used, especially for distant vision. The prisms, starting from the vertical, have the edges rotated outwards till diplopia threatens, then partly returned again and the process repeated.

Some recommend bromides, hyoscyamus and similar sedatives for esophoria, but I have found little need for these, which, after all, do not reach the root of the matter.

Myopic esophoria is curable by training with the verger, or, that failing, by operation.

All patients have not the time or strength for training, and we then may prescribe prisms, with their edges inwards, to be worn, provided the symptoms are sufficiently great to justify their use. They can be ordered either to correct about half the esophoria, or by Percival's rule, depending on the breadth of fusion, as already described. They may, in doubtful cases, be ordered in a grab front, to be added to the ordinary correction, as an experiment, though personally I have not made much use of this plan.

Finally, as a last resource, operation is valuable in some cases. It is necessary, first, that esophoria should be present in near as well as in distant vision, and advancement of the external rectus is advisable in most cases, graduated tenotomy of the internal in a few.

Exophoria is generally due to want of tone of the converging innervation, brought about either by impaired health, by reflex withdrawal of nerve energy, or by want of support from accommodation, as in myopes. Since convergence is an easier task than divergence, exophoria of high degree is often tolerated perfectly.

Our first endeavour should be to treat the cause, and if there be any error of refraction, that should be under-corrected in the case of hypermetropia, and fully corrected in myopia. In very young children with exophoria, I have even ventured to over correct the myopia, with excellent results. Bracing air, exercise and nerve tonics, such as Bynin-Amara, with open windows at night, should be prescribed.

Prism training is often very effective, for even though it may not much lessen the exophoria, toleration for it is acquired. The prism verger answers well for this purpose, the edges of the prisms being gradually rotated inwards, while objects, sometimes distant, sometimes near, are carefully fixed.

We need, in exophoria, to be careful about prescribing prisms for relief, since they withdraw the support which accommodation is accustomed to receive from the converging effort, and this, I think, may account for the many disappointments experienced by those who have endeavoured to relieve the defect too much. Prisms need rarely correct more than a quarter or third of the defect at most. To obtain the effect of prisms by decentring lenses, we need only divide ten millimetres by the number of dioptres in the the lens, to obtain the amount of decentring required for each centrad of deviation, or divide eighteen in the same way for each degree of deviation.

Lastly, advancement of one or both internal recti is advantageous in some cases of exophoria, avoiding tenotomy as a rule.

Hyperphoria is so easily revealed by the rod test that no other is generally necessary, but in a doubtful case the double prism may be used, when the image seen by the naked eye appears higher or lower than midway between the other two images if hyperphoria be present; and that vertical prism placed before the naked eye, which makes the images equidistant, measures the defect. Hyperphoria is also equal to half the difference between the highest prisms edge up and edge down respectively, which can be overcome.

It is probably congenital in many cases. I have found its amount wonderfully persistent year after year. It is sometimes produced however by spectacle frames which have become bent, so that one lens sits higher than the other. In this case it is only temporary.

Paretic hyperphoria should be carefully watched for, by measuring with the forehead and chin alternately thrown forwards. It is frequently overlooked.

Relieving prisms are so satisfactory in the treatment of low degrees of hyperphoria that training by adverse prisms is not often indicated, unless with patients who can easily afford the time and attention. Relieving prisms, edge up before the hyperphoric eye, or down before the other, or both, may be allowed to correct three-quarters of the defect. Nature does not need quite a full correction, but only kindly help. When glasses are not worn, or not desirable, *training* enables toleration of the defect to be acquired.

In high degrees, careful tenotomy of the superior rectus of the higher eye, or advancement of the superior rectus of the lower eye, may be practised. In selecting which of these two procedures to adopt, we should be guided by the cyclophoria present, since incyclophoria is relieved by the tenotomy and excyclophoria by the advancement; also we should take into account any anaphoria and cataphoria, in the former of which the motor field exceeds the usual limits upwards and comes short of them downwards, while in the latter, these conditions are reversed. Operation should be such as to lessen the excessive and increase the deficient excursions.

In theory it is very important, in cases of heterophoria of high degree, and especially for our guidance in operating, to measure those portions of the motor field which lie within the province, and also opposite to the province, of the muscle concerned. Surgeons have long taken account of deficient abduction of the squinting eye in convergent strabismus, and of the deficient adduction in divergent strabismus, but we owe to Stevens the idea that similar measurements should be made in heterophoria, for which his well-known instrument, the tropometer, is well adapted. He takes the normal excursion upwards to be 33°, downwards 55°, inwards 55°, outwards 50°. In practice, the measurement of the motor field for such slight defects as are usually included in heterophoria, is greatly reduced in value by the fact that the excursion depends entirely on the will power of the patient, and, owing to geometrical considerations, the tropometer does not give the same readings for equal rotations for eyes of different builds, and in which therefore the centre of motion lies at different distances from the cornea.

The older perimeter methods, though free from this objection, are not available in many cases, because of the intervention of the nose while attempting the measurement of adduction. In practice such measurements are rarely made; von Graefe's simple rules for the use of the canthi contenting the ordinary observer. A few important cases, however, deserve as accurate a measurement of the excursion as the means at our disposal allow.

An otherwise unusually reliable and excellent monograph on the ocular muscles (Hansell and Reber) states that hyperphoria is greater in near than in distant vision. This, I think, may be a misconception through omitting to take account of the simple fact, to which I drew attention many years ago, that prisms exert a smaller effect on the deviation of an eye in near than in distant vision. That these authors should arrive at their conclusion by clinical experiment proves the accurate nature of their work, even if a different interpretation needs placing upon it. Dr. Reber tells us that he relieved his own hyperphoria of 3° by a fully correcting prism, and with perfect satisfaction to himself. In near vision, however, this prism would give rather less than the full correction.

Our next subject is **Cyclophoria,** which means the tendency for the eyes to rotate about their own visual lines as soon as they are liberated from fusion, so that their vertical diameters lean towards, or away from, one another. In the first case it is called incyclophoria, in the second, excyclophoria.

Cyclophoria is very easily revealed by the glass rod test, since if the disc of rods be placed in a trial frame, it can be rotated like a trial lens, until the streak of light appears perfectly vertical to the patient. The torsion of the eyeball then agrees with the displacement of the rods from the vertical or from the horizontal. Thus, if the temporal end of the rods then dips 10°, the eyeball has 10° of excyclophoria.

It was Professor Savage who first directed much attention to cyclophoria in near vision, using my double prism for the purpose. He showed that, when a horizontal line is triplicated by its use, the relative torsion of the middle line, which belongs to the naked eye, is easily perceived, the actual torsion of the eyeball of course being in the opposite direction to the apparent torsion of the image. Thus, if the left be the naked eye, and the right-hand end of the middle line appear to dip, there is excyclophoria.

Numerous cyclophorometers have been introduced in America, mostly utilizing either the double prism or glass rods, or both, and enabling the measurement to be more accurately made, while Dr. Stevens utilizes a principle first employed by Volkmann long ago, viz: that of regarding two discs placed in the ends of two tubes, each marked with a radius, so that by rotation of the tubes the two radii can be made to appear in the same straight line. To such instruments Stevens has given the name of "Clinoscopes." By using diameters instead of radii, the amplitude or range of binocular torsion can be measured. He finds the extorsion part of the range slightly greater than the intorsion part, the former being about 11° with vertical lines and about 3° with horizontal lines.

The relation between cyclophoria and astigmatism has been already referred to.

Excyclophoria is a much more common condition than incyclophoria and may, in its minor degrees, be wholly disregarded. It plays the part, I believe, in torsional balance, that exophoria does in horizontal balance.

Simple cyclophoria rarely requires treatment other than constitutional, and the correction of any refractive error. Professor Savage has practised training with the use of strong cylinders so as to utilize the apparent twist of a straight line produced by an oblique cylinder. The twist, however, is small compared with the other optical properties of a cylinder, and naturally the eyes become tired with its use. A far better plan, I think, is to employ a stereoscope, with ordinary pictures, which, however, are set slightly awry with respect to each other. The interest is thus kept up. Dr. Perry, of Oneida, has invented a most simple and ingenious plan for yoking two discs of cardboard together so as to revolve in reverse directions, and affixed a line of identical print to the centre of each, so as to be combined in a stereoscope. By slight, gentle rotation of the discs the torsion-correcting faculty is exercised.

Duane has recommended the use of two of my rod tests, one before each eye, rotating one of them, while the patient endeavours to preserve the integrity of the streak of light. For this purpose I would recommend replacing the rods by a very strong plano-cylinder, such as I show you, which I described many years ago. It gives a more delicate and sharp-edged line of light.

All such exercises, however, are in general unnecessary, as cyclophoria is rarely a source of trouble in itself. My friend, Dr. Stevens, of New York, is very fond of operating for cyclophoria, preferably by extending one corner of a cut tendon towards the cornea, letting the other corner retract. I have only once operated for cyclophoria. It was in the case of a bank clerk, who for seven years had been troubled with unceasing headache After displacing the tendon of the internal rectus upwards, he wrote (though ten months later) to say:—"I am fast losing the pains in my head, and, in fact, feel so much better that I scarcely know myself." In this case probably the operation did some ultimate good.

In connection with muscle balance it is usual to consider the subject of **false torsion.**

The *parallel motions* of the eyes are unaccompanied by torsion when they take place in either of the four cardinal directions, *viz.*: directly upwards, downwards, to right or to left. In every other direction they are accompanied by torsion, and to each direction of vision belongs a definite and constant amount of torsion, independent of the route by which that direction has been reached. This law, associated with the name of Donders, is well known. It only remains to point out why it should be so.

It is evident that the mind could not correctly allow for this secondary torsion, so as to make a true correction for it, were the same direction of the eyes to exhibit varying torsion at different times. Thus, to give an example, a soldier, lying prone before a distant target, with his eyes directed 45° upwards under his brows, and on then looking at a flagstaff 45° to his right, would, owing to secondary torsion, receive its image upon linear portions of his retinæ inclined by nearly 10° from the prime vertical meridians, yet the flagstaff does not appear to him to be tilted, because of the mental correction which he unconsciously makes, having learned for all time to associate a certain amount of torsion with that definite direction of his vision.

On looking up and to the right, or down and to the left, both vertical meridians lean to the right, the converse being the case for the remaining two diagonal positions of the motor field.

The study of spectral images confirms Listing's law that rotation of the eyeball from the primary position takes place about an axis perpendicular to the plane which is common to the visual axis in its primary position and the visual axis in its new direction. Extraordinary diversities of opinion have been expressed about the consequences of this, though all experimenters agree as to the basal facts revealed by spectral images. I need not enter here into the diversity between Helmholtz in one direction, Eaton in another, Donders and Le Conte in a third, the two latter being correct, though neither of these give a formula.

The formula given by Helmholtz is correct in terms, though its signs need reversing, for, strangely enough, he described the torsion to take place in the direction exactly opposite to the fact. It is easy to work out a formula by plane trigonemetry, as I have shown in my book. By spherical trigonometry it is simpler still, and I obtain the same formula by its means.

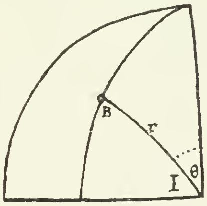


Fig. 4.

Only while preparing for this lecture have I made the very interesting discovery that the problem of false torsion is merely that of an old friend revived, *viz.*: Great Circle Sailing. The change of course experienced by the track of a ship in crossing successive meridians during great circle sailing, agrees perfectly, I find, with the torsion of the eye when the pupil follows a path similar to the ship's track. The tables published by the Admiralty become thus immediately available for solving any question of false torsion. Instead of thinking of the rotation of the eyeball as a whole, let us imagine it to be a spherical sea, over the surface of which the pupil sails like a ship. In arriving at any secondary position after starting from the primary, the pupil will have rotated like a wheel to precisely the same extent that the ship's course would have changed in following a similar course, provided that the starting point be that of the primary position of the eyeball.

The principle is illustrated in Fig. 4 which shows one quadrant of the spherical sea. The vertex of the angle I is the primary position of the pupil, that of B its secondary position, and *r* its track. θ is its course at starting, and B its course at finish; the difference between these two gives the torsion of the eyeball.

An elementary formula for any right-angled spherical triangle, if the known acute angle be I, the unknown one B, and the hypotenuse *r*, is

$$\cot B = \tan I \cos r \quad \ldots \quad \ldots \quad [1]$$

Letting X stand for the torsion, but for which the meridians touched by the two extremities of *r* would be parallel:

$$\begin{aligned} B &= (90^\circ - I) + X \\ &= 90^\circ - (I - X) \\ \therefore \quad \cot B &= \tan (I - X) \\ \text{and by } [1] \quad \tan (I - X) &= \tan I \cos r \\ \text{or} \quad X &= I - \tan^{-1}(\tan I \cos r) \end{aligned}$$

This formula is identical with that arrived at by a totally different, cone-generating method, which I have previously published.

Meissner's Torsion.—Quite distinct from false torsion, and bearing no relation to it whatever, is another kind of torsion, first described and worked out by Meissner. He found that when a vertical thread is held either further from, or nearer to, the eyes, than the point of fixation, its double images are inclined to each other, in such a way as to indicate rotation of each eye about its visual line, outwards. This binocular extorsion increases with the elevation of the visual plane, and also with increasing nearness of the fixation point. On looking downwards it becomes less, until, at a certain angle of the visual plane, it disappears altogether, and if the eyes look lower still it may even give way to torsion in the opposite sense, *viz.*, binocular intorsion.

I have shown elsewhere how to obtain a formula for Meissner's torsion, and arrived at the following: If T stand for the torsion; I for the inclination of the vertical thread required to make its two images appear parallel; and C for the convergence of the eyes; then

$$\tan T = \tan I \sin C.$$

Nature has clearly adapted the eyes for looking downwards when engaged in near work, and since Meissner's torsion becomes greater when the eyes look upwards for near work, it has occurred to me as just possible, that Meissner's torsion, or rather the efforts made to correct it, may contribute one element to the ocular fatigue which brings on miner's nystagmus.

CLINICAL MEMORANDA.

A PECULIAR COLOUR REACTION ON OPENING TENON'S CAPSULE.

BY

J. Burdon-Cooper, D.O.Oxon., F.R.C.S.,
BATH, ENGLAND.

A few days ago in doing an advancement of the external rectus I was surprised to find the whole area of the operation assume a most beautiful Wedgwood blue colour.

There was nothing remarkable on dividing the conjunctiva, but immediately Tenon's capsule was incised, a blue colour developed, which deepened rapidly into a dark Prussian blue. The whole area became so densely coloured that it was impossible to make out the muscle at all. A stream of lotion was directed on to the operation area and the colour gradually faded or was washed away. The instruments and lotion were precisely similar to what I have used in similar cases before. Cocaine and adrenalin were used as instillations for the eye, and a hypodermic injection of scopolomorphine had been given an hour before the operation, as is my usual custom. The patient was taking no drug.

I am unable to give any explanation of the reaction, and I have never experienced the like before. If others have seen such a reaction, I should be greatly interested to hear of it. My impression is that the colour developed is one of the soluble blues containing the iron and cyanogen groups, possibly the ferro-ferrocyanide ; salts which are known to possess the property of turning blue on exposure to the air. It would be interesting to ascertain whether the synovial fluid in Tenon's capsule contains a cyanide.

A FORM OF FAMILY CHOROIDITIS.

BY

A. W. Stirling, M.D.,

ATLANTA, GEORGIA, U.S.A.

Miss E. G., aged 23 years. When eight years old, went blind in about a week. Her vision is now "fingers," and she can read large type, which is much the state of matters which has existed since the eyes first failed. She knows of no cause for her blindness. She saw well before, and had no illness or pain.

The right fundus exhibits in the centre and covering an area of three or four O.D.'s a bluish-green and white mottling, with one or two black spots, in front of all of which the retinal vessels pass. The choroid also appears thinned. On the lower temporal vessel, at the junction of a branch not far from the macula, is a pure white area, a quarter of an O.D. in size. The O.D. itself is long vertically but normal. The left fundus is much the same as the right, but there are several white areas.

The patient has had three brothers. One was shot when aged 19 years. His eyes were affected, apparently exactly like the patient's, when he was eight years old. He could see no better than she can. The second brother, now aged 18 years, has good eyes. The third, now aged 13 years, also lost his sight in a week when eight years old. She has two sisters, 15 and 9 years old respectively, both with good eyes. There have been five other children in the family, two dying when about six weeks old, and three were born dead.

The patient exhibits no sign of syphilis. The patient's eyes are dark-brown ; the eyes of the two affected brothers were brown or grey : all the others were blue except those of the sister of 9 years, and these are black.

There was no consanguinity in the parents.

COLOUR SENSATION.

BY

J. A. WILSON, M.D.

GLASGOW, SCOTLAND.

Mrs. A., aged 45, came to the Ophthalmic Institution, Glasgow, complaining of difficulty with near work. Her vision was $\frac{6}{6}{}_{(2)}$ with each eye, and on testing her refraction by retinoscopy, without a mydriatic, the shadows were hypermetropic, and a + 2 D. spherical lens was required to reverse them. When she held Jaeger's near types at reading distance, the patient said that she saw the letters coloured blue and yellow, and when they were held further away at $\frac{2}{3}$ of a metre, that the letters were black. While she held the types at reading distance, I slipped a + 2 D. lens in front of each eye, and she immediately said the letters had become black.

I would describe her as being a healthy, unemotional woman.

My colleague, Dr. Wright Thomson, confirmed the observations.

NOVELTIES.

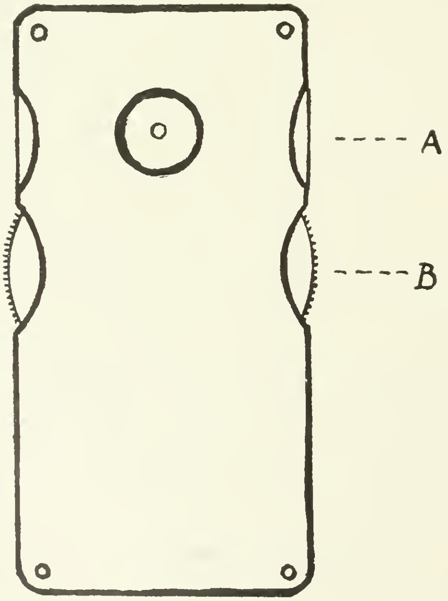
SCOTOMETER FOR MEASURING CENTRAL SCOTOMA.

BY

R. BEATSON HIRD, M.D., F.R.C.S.Edin.

BIRMINGHAM, ENGLAND.

For the past six years I have been using a pocket scotometer of my own design which seems to answer all the requirements of an instrument for measuring a central scotoma. I feel, however, that I owe an apology for introducing another pattern when there are several already on the market. I claim certain advantages for mine. It is very portable, being the size of an ordinary calling card, and so can be carried easily in the waistcoat pocket.



Its construction is perfectly simple. It is made of metal which is dull black and has a circular opening, 10 mm. in diameter (*see* diagram). This opening can be narrowed by means of a sliding diaphragm (A) with openings of 5 mm., 2 mm., and 1 mm. diameters. There is a milled wheel (B) which brings white, red, green, and blue behind the circular opening. The whole is held together by a screw at each corner, which can be undone for renewing the colours.

The advantages I claim for my scotometer are:—

(1) Portability.

(2) A dull black surface. There is nothing to attract the attention of the patient but the circular opening. I think a dull black surface is important. We always use such a surface for our perimetric and scotometric observations.

(3) A clearly-defined circle of colour. This can only be obtained by having a thin diaphragm which fits closely on to the coloured surface. No shadow is thrown by the margin of the ring, and so the area seen is the same size as the diaphragm.

(4) The price. It is excellently made by Messrs. Dixey & Son for the cost of 3/6, being about a third of the cost of similar instruments.

It was only when I saw the scotometer designed by Mr. R. R. Cruise that I found we had both made use of the same principle. I had one of his pattern made for me in black, but found no advantage over my design.

NOTES FROM SOME CONTINENTAL EYE CLINIQUES.

(*Third Article*)

BY

ERNEST THOMSON, M.D.,

SUB-EDITOR OF "THE OPHTHALMOSCOPE,"
GLASGOW, SCOTLAND.

III.—BERNE.

The Augenklinik.

I had heard when at Freiburg (Germany) of Professor Siegrist's new *Augenklinik* at Berne, and I determined to spend some days at the capital town of Switzerland. The weather was very unpropitious, and the town by no means showed to advantage, but I met with such a hearty welcome from the Professor, who was delighted to show me his new building and everything in it, that I was well compensated for the ill-treatment meted out by the meteorological department.

Professor Siegrist has himself been responsible for the planning of this eye hospital, and made himself acquainted with most of the European hospitals before setting out to incorporate in this one all that he considered best in the others.

The plans of the new *Augenklinik*, as a part of the general improvement of the *Inselspital*—a general hospital built on the pavilion system in 1880-1884—were passed in 1905 and were estimated to cost £26,909 to execute. The buildings were completed and occupied in May, 1908.

I am not sufficiently informed as to the conditions under which patients are admitted to hospital in various Continental cities to enter into details of the various classes of patients. It may suffice to say that in certain parts, at any rate, the hospitals contain wards—or bedrooms—of different grades set apart for the private patients of the Professor. In such hospitals the Professor has a consulting room for himself in which he sees private patients. The *Augenklinik* at Berne—and also the one at Freiburg, in Germany, previously described—are in this way provided with a complete floor for the use of private patients. The plans for the new *Augenklinik* at Berne show provision for 70 ordinary and 25 private beds. The average yearly number of new patients attending the out-patient department is 5,000. About 100 students attend the lectures and demonstrations of the Professor, who at the present time has four assistants.

Undergraduates are not allowed in the out-patient department. They are taught clinically by the study and discussion of selected cases. They are invited in rotation, a few at a time, to attend the operations. They receive instruction in ophthalmoscopy, not in the dark room of the out-patient department, but in a special large ophthalmoscopic room on the basement floor (*Tiefparterre*). On this basement floor are also to be found the animal houses, the animal operating room, the Zehender library, and the photographic room.

Students being excluded from the out-patient department, and from the hospital in general, except by invitation, enter the lecture hall (where the major portion of their instruction is received) by a special entrance.

As a corollary of the exclusion of students, the out-patient consulting room (*Behandlungsraum der Poliklinik*) is small, and only one patient, or at most two, are admitted at a time from the waiting room. Further, since arrangements are made to exclude students from the hospital department, equal care is taken, as one would expect, to prevent contamination by the out-patients. The out-patient department (*Poliklinik*) is, in fact, shut off by doors from the main corridor of the hospital on the ground floor (*Hochparterre*). Through these doors patients in the out-patient department are not allowed to pass.

A reference to the plan of the ground floor, which I am able to reproduce by the courtesy of Professor Siegrist, will show the general arrangements of the out-patient department, laboratories, etc., better than any description, but some words of explanation and amplification may be useful to those interested in planning and improving their own hospitals.

(1) A small room for examination of blood and urine opens off the out-patient consulting room. It is provided with a sink, drying racks for test tubes, centrifuge, microscope, reagents, etc., and has a couch in it for the occasional fainting fit, which, as all have experienced, is an accident to be reckoned with.

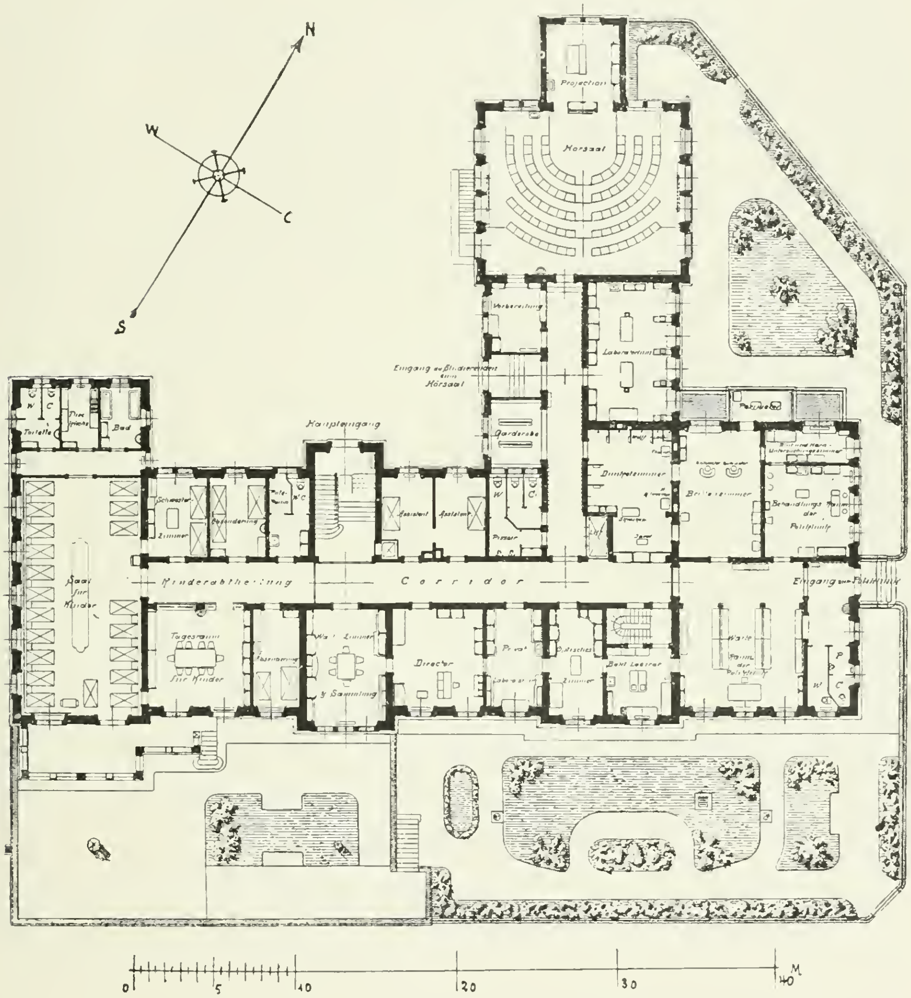
(2) In the *Consulting Room* the operating couch is illuminated by lamps which are attached to flexible metal tubing (like motor horn tubing), stiff enough to remain in any required position.

(3) In the *Refraction Room* (*Brillenzimmer*) artificial light is exclusively employed. A modification of Cooper's optometer is preferred by Siegrist to the trial case and frame. The floor is of mosaic, and the metric distances are marked in mosaic, a most excellent device.

(4) The *Dark Room* (*Dunkelzimmer*) is a spacious one, considering the number of patients and the absence of the students. The bays are of ample size; both stools (surgeon and patient) are movable; the lamp (Siegrist's) is universally adjustable and adaptable, and is suspended from the wall; there is no table to interfere with the position of surgeon or patient; and there is a drawer in the partition, for his convenience.

The dark room contains also the Berne model of the Javal and Schiötz ophthalmometer with red and green mires (complementary colours), corneal microscope, and some other apparatus.

(5) The *Perimeter Room* opens off the refraction room. It is an out-building with a large window facing north. Over this window a white blind can be drawn. The room contains two Pflüger's perimeters arranged as right and left, and a Skeel's perimeter. (It will be remembered that in the Pflüger instrument the whole field is represented in the form of a hollow shield).



On the opposite side of the main corridor is a series of rooms opening off one another:—

(6) A small *Bacteriological Laboratory* opens off the patients' waiting-room (*Warteraum der Poliklinik*), and is used principally in connection with the out-patient department. Beside it is a private stair leading to the basement flat (animal houses, etc.)

(7) The *Optical Room* has an optical bench, and is intended for research work.

(8) Next come the *Professor's Private Laboratory* and his *Consulting Room* (*Direktor*, in the plan).

(9) The professor's *Waiting-room* (*Wartezimmer*) serves also as a store-room for apparatus of an optical character and as a library of current literature. On the walls are portraits of the four predecessors of the present professor, namely, Rau, v. Zehender, Dor, and Pflüger.

The waiting-room, and the main entrance opposite to it, together form the western boundary of what one may call the laboratory department on this floor. Passing through swing doors one enters :

(10) *The Children's Department* (*Kinderabteilung*).—Apart from the essential sadness of eye disease in children (and in one of the children's isolation wards I saw a terrible case of inoperable malignant disease), the children's department is rather amusing. Separated from their "parents and guardians," and under the kindly but despotic rule of the sister-in-charge, the behaviour of these children was marvellously different from the usual behaviour when "mother" is on the scene, or when they are associated in a ward with adult patients. I shall always carry with me a joyous recollection of a row of about twenty young children drawn up to receive the Professor on his visit in true military fashion. Had it been in Germany, one might have said "militarism *in excelsis*." When the Professor left the ward and said "*Adieu*," the whole row shouted in unison "*Adieu, Herr Professor !*"

It is worth noting that in the isolation wards, which, as can be seen from the plan, are not separated by any open-air space from the other wards, diphtheritic conjunctivitis and gonorrhœal ophthalmia are accepted.

A special part of the surrounding garden is exclusively devoted to the use of the children.

We must now turn to the northern wing of the building, which is built out. It includes the lecture hall (*Hörsaal*), its ante-room, and its projection apparatus room ; the anatomico-pathological laboratory ; and accommodation for male and female students, including cloak room and lavatories.

The lecture hall and laboratory are the result of much thought and study on the part of the present professor. One cannot, without having seen *all* the similar buildings in all the eye *cliniques*, say whether they do or do not represent the last word in design ; but, at any rate, they appeared to me so eminently well suited to their purpose that no excuse seems necessary for describing their principal features.

The Lecture Hall.—Reference to the plan will show the shape, size, and general design, but will not disclose certain essential details.

It will be remembered that students do not attend at the out-patient department ; therefore the lecture hall must be suitable for clinical teaching. This implies, in the case where patients may be more or less blind, the following somewhat antagonistic *desiderata*.—(1) The room must be very light, yet, if required, very dark. (2) The rows of students' seats must be elevated one above the other, and the students must have a note book rest, yet the half-blind patient must be able to "circulate" between the rows. The latter cannot do so (*a*) if there be desks between the rows of students, (*b*) if there be steps to trip over. The method of getting over these difficulties seems beautifully simple when you know it, yet the working out of the details must have cost Professor Siegrist both time and patience.

The first requirement, an alternately light and dark room, is obtained by having large windows fitted with black screens which can be raised or lowered in fifteen seconds (for the ten windows) by an electro-motor. The switch of this is on a switchboard beside the lecturer. By means of another switch, three arc lamps, with underhung reflectors, can be lighted up. These illuminate the room by reflection from the ceiling. The room can be rendered absolutely dark at any season of the year, or, by means of a third switch, a small lamp beside the lecturer can be brought into use. A speaking tube to the operator of the epidiascope, and an electric bell to summon an assistant when wanted, are among the many refinements of this hall.

The second requirement, room and facility for the patient to "circulate," combined with the necessity of a book-rest for each student, is more complicated.

Reference to the plan will show that there are eighty-six chairs arranged in five concentric rows, with a passage up the middle and a gangway at each side. Now, each row stands 10 cms. higher than the row in front, and is separated from the row in front by a clear space of 70 cms. The passage down the middle is composed, as one would naturally expect, of four broad steps 10 cms. in height, but the gangways up the sides are not stepped ; they slope obliquely until they meet the topmost floor of the flight, upon which stands the back row of seats. The patient has thus no steps to mount. He goes along between the rows from one end to the other, and then ascends an inclined plane to the next row.

Further, the student has a book-rest provided by the particular pattern of chair (copied from Straub's *Klinik* in Amsterdam). This has one arm rest (right). the end of which terminates in a flat surface well towards the front.

The *Pathological Laboratory* is not a large room but it is planned to give a maximum of convenience to the worker. The four windows face the east, and opposite each window is a " working place " fitted out with almost everything the individual worker will require. Each " place " has a table, with microscope, lamp, and Bünsen burner. To the right of each table is a sink, and the partitions which separate the " places " are fitted with shelves for all ordinary reagents and for preparations. In the centre of the main room are tables with the microtomes. At one end of the room are the paraffin ovens, etc., with canopy flue, and at the other end the main hot and cold water supply, sinks, etc. Along the wall opposite the windows is a perfectly arranged large cabinet of microscopic material and specimens. It is impossible within reasonable space to describe all the details, but enough has been said to show that this comparatively small laboratory has been planned, like the rest of the building, to give the greatest convenience in working.

It would occupy too much space to give the particulars of the other floors. The first floor has the male wards and day-room at one end, the female at the other, and the operating rooms, staircase, and hoist in the middle. There are five beds for cataracts on the female and eight on the male side. The second floor is devoted to private patients, and the third floor to the assistants and the household staff.

Operative Technique.

Much as I should like to describe everything I saw in this new eye hospital, I must confine myself within reasonable limits, and be as brief as is consistent with the idea of bringing out the principal points.

The Operating Room is, as has been mentioned, on the first floor, and situated between the male and female wards. It consists really of three rooms, namely, the operating room itself ; on one side of it the sterilizing room, and on the other the preparation room. In the preparation room is the hoist, so that patients can leave the operating room and be taken up- or downstairs with a minimum of exposure

The operator and assistants prepare themselves in this room. They don black rubber overalls and clogs, but do not wear masks. Visitors wear cotton overalls. In the *Sterilizing Room* instruments and solutions only are sterilized. A canopy flue conducts away steam and gas fumes. Dressings are brought over, already sterilized, from the surgical department of the *Inselspital.*

In the *Operating Room itself* the most important article of furniture is Siegrist's *Operating Chair Table.* This table is of the pedestal type, is movable in all directions, raises and lowers by simple pressure on a pedal. It has, however, another outstanding feature: by pressure on a pedal, the table assumes its lowest position, and by two other movements, the head end is raised to form a chair-back, while the foot end is dropped to the floor. The patient walks in, takes a seat in the chair, and, then, by a corresponding series of movements, the chair becomes a table and the patient is in the position for operation.

The next important feature—one which perhaps has not yet had sufficient attention paid to it in many *Kliniks*—is the *illumination.* For cataract, and operations on the eyeball generally, Siegrist prefers artificial light, but employs daylight for strabismus operations, enucleation, plastics, etc. He has, therefore, endeavoured to provide himself with the best possible arrangement for each means of illumination. The window is very large and faces approximately north, and it is provided with an opaque screen, lowered in few seconds by means of a small winch, by which daylight can be completely excluded.

For artficial light there are two pedestal lamps, but one of these was not in use and so I did not study it. The other, which Siegrist prefers, is a somewhat heavy, but in consequence very stable piece of apparatus, which gives excellent light. On a telescopic pedestal is mounted a large glass condenser, with an ordinary electric lamp in a fixed position relatively to the flat side of it. The condenser and the lamp move together on a joint, in such a way that the beam of light can be directed wherever it is required. The objection to this lamp is that it is rather heavy for quick transference from one side of the table to the other, but it has the compensating advantage of great rigidity.

The operating room contains, in addition to the usual furniture, the Klingelfuss-Mellinger "Innenpol" Magnet, and the Krönlein "Pantostat" apparatus for every variety of electric application.

With regard to the *preparation of the patient* for operation and the *operative toilette* in general. In this *clinique* fluid is plentifully used. The lids are everted and the conjunctival sac is washed out thoroughly with mercury oxycyanate (1:2000) followed by saline, which is contained in unusually large flasks. During operation fluid is used, but a smaller flask is employed. This flask is provided with a fine silver nozzle, which Siegrist does not hesitate to introduce, if necessary, into the anterior chamber. The gauze face mask, with hole for the eye to be operated on, is used; the hole is so small that only the eyeball, not the eyebrow or cheek, is exposed. Collargol, 3 per cent. is a favourite application after operation. Dressings are kept in place with a broad bandage. As to *prophylaxis*, Siegrist is, in general, content with the examination of smears and the treatment of any conjunctivitis which may be present. Collargol is largely employed for this purpose.

Individual operations.—Of the operations which I witnessed I shall discuss only those of which the *technique* has been specially studied and perfected by Siegrist and his pupils, namely, enucleation and evisceration under local anæsthesia. I shall endeavour to give the method as precisely as possible, since it is perfectly certain that if any well-known surgeon can select this method *as routine* (with certain exceptions) on account of its convenience, it is worthy of a fuller trial by others than it has yet received. I shall adhere in essentials to the latest description of the method, which is by Edwin Mende (*Klin. Monatsbl. f. Augenh.*, Mai-Juni, 1911), to whose paper on 155 operations at Berne, those interested can refer for tabular statements; but it is to be understood that I witnessed these operations myself, and that neither of these patients gave any evidence of pain. Both were quite well after the operation, and walked to their ward.

The conjunctival sac is treated four times with a 2 per cent. cocain solution to which a few drops of adrenalin have been added. Then, with a glass syringe of 2 cubic centimetres capacity, fitted with a long, specially-curved needle, a retrobulbar anæsthetic injection is made on the temporal and nasal sides, 2 c.c. in each position. It has been found, as a matter of experience, that it is not necessary to inject in more than two places, and that the result (as regards painlessness) is better if the injection is not made *through* the muscles. Therefore, the temporal and nasal injections are made somewhat below the mid-horizontal line. If enucleation is to be done, an additional 1 c.c. (total) is injected sub-conjunctivally in the neighbourhood of the four recti. *When anæsthesia is complete, the upper and lower eyelid, skin, and their immediate neighbourhood, become white as compared with the rest of the face*; this happens in about five minutes with the stronger, and in ten minutes with the weaker, anæsthetic solution about to be described. The appearance is extremely characteristic.

The injection fluid is in two strengths, namely, a 1 per cent. and a 2 per cent. solution of novocain, to which, after sterilization, a few drops of adrenalin, 1 to 1,000 (Parke Davis), have been added. Cocain solution of the same strength may be used instead of novocain, but Siegrist now prefers the latter. The stronger solution is suitable for young and robust patients, the weaker for the old or decrepit. A sedative (0·5 gramme veronal) is given the night before, and also half an hour before operation.

The needle employed for the retrobulbar injection measures two inches along the curve from its attachment at the butt end up to the point. It is shorter than that employed by Axenfeld, but from observation I should think that the correct insertion of either type of needle alongside the eyeball, so as to inject the solution in the immediate neighbourhood of the optic and ciliary nerves, requires some practice. I can assure those who may be considering the operation, that in the three cases I have now witnessed there was no evidence of any pain. I should think that a failure to get complete anæsthesia, due to slightly incorrect *technique*, is only what a surgeon doing the operation for the first time might expect to experience.

In describing the Axenfeld *technique*, I mentioned that Axenfeld advised passing the needle alone, to begin with, in order to avoid injecting into a vein. Siegrist takes no such precaution, and has never had any complication. Further, I may be excused for saying that Axenfeld himself did not, in the operation I witnessed, pass the needles alone, but injected right away.

The following are the only contraindications, according to Siegrist (Mende, *loc cit.*)—

(1). Children and excitable people are not suitable subjects. In these the psychical shock is more to be feared than that after narcosis.

(2). When an eyeball is so badly damaged, as by dynamite explosion, for instance, that the needle cannot be guided to the optic nerve region.

(3). In panophthalmitis when the eyeball is open to the conjunctival sac, and in purulent conjunctivitis, on account of the risk of causing an orbital abscess.

I will not occupy space in speaking about the actual enucleation and evisceration, except to say that Siegrist did not insert any foreign body into the sclera in the latter case. It is impossible to refrain from relating in this connection, the remark made to me by a very well-known ophthalmologist in another city. Discussing the question of placing glass or metal balls, or even fat, into the sclera or Tenon's capsule, the professor in question remarked: "No, I don't do these operations. The balls, and so forth, nearly all come out in the long run, and it is Müller, of Wiesbaden, who gets the removal of them." It is hardly necessary to say that Müller, of Wiesbaden, is the maker of artificial eyes.

Therapeutic Notes.

Syphilis.—Siegrist has found that "606" is of no service in hereditary interstitial keratitis.

Tuberculosis.—He has given a fair trial to almost every variety of tuberculin, and has nearly given up using it on account of absence of definite results.

Glaucoma Simplex.—Siegrist never performs iridectomy in these cases. He is satisfied with sclerectomy after the method of de Vincentiis, and this is his operation of choice. With a Graefe knife a sclerectomy is made by puncture and counterpuncture in the usual way; but instead of withdrawing the knife at once, the point is made to incise the ligamentum pectinatum in the angle of the anterior chamber under the bridge of tissue which has been left above or below, as the case may be. I shall make further reference to this operation in articles dealing with other *cliniques*.

TRANSLATION.

4.—GUIDE TO THE MICROSCOPIC EXAMINATION OF THE EYE.

(*Continued.*)

BY

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PROFESSOR STOCK (FREIBURG)
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TRANSLATED FROM THE THIRD GERMAN EDITION,
BY
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Nuclear Stains and Double Stains.

Every staining solution should be filtered before being used.

II. THE PARAFFIN PROCESS.

Imbedding in paraffin possesses two great advantages. In the first place, very thin sections can be obtained; and, secondly, continuous serial sections can be produced without difficulty. But it is not without its disadvantages. Most preparations are unable to resist the high temperature involved in the process, so that almost all workers perfer to use celloidin. Further, if paraffin is employed, large sections, *e.g.*, sections of the complete bulb, are difficult to cut. Finally, in it the delicate structures of the eye, such as the connective tissue of the optic nerve, are prone to shrink.

At the same time, when it is desired to submit small sections to minute examination, paraffin should be chosen, and beautiful results can be obtained by careful working.

Paraffin penetrates the lens with great difficulty and should not be used for this or for a thick sclera.

Two paraffins of different melting point, a soft and a hard, are used. They are mixed in proportions that depend on the temperature of the laboratory. When this is low, a larger proportion of soft paraffin is taken ; when the temperature is high, the hard paraffin should be in excess. In general, equal quantities of the two kinds are used. These are placed in a suitable vessel, and slowly melted in the incubator at a temperature which should not rise higher than a degree or two above the melting-point of the mixture.

The author employs a *Soft Paraffin* whose melting-point lies between 40° and 42° C., and a *Hard Paraffin* whose melting-point lies between 52° and 54° C. The temperature of the incubator should be somewhat higher, 60° or at most 62° C., and is kept at this point by means of a *Regulator*.

The pieces of the hardened bulb must be thoroughly dehydrated in absolute alcohol.

They are now saturated with an *Intermediate Fluid*. As such xylol may be recommended, and, if this is chosen, the immersion should not be of longer duration than 4-6 hours, or the tissues are rendered too brittle. Chloroform (24 hours) may be used, or turpentine, cedar oil, etc.

When the structures to be treated are very fine, the transition from alcohol to the intermediate fluid should be gradual, so as to avoid violent diffusion currents and shrinking of the tissue. This is prevented by putting the heavy intermediate fluid into a test tube, and carefully pouring a column of absolute alcohol over it. The specimen is then gently lowered into the tube, and lies on the interface between the fluids. When thoroughly impregnated by the heavier fluid it sinks to the bottom. Then the alcohol is poured off, and the tissue left for a few hours in the pure intermediate fluid.

The next step is to pour the fluid and tissue into a staining-glass, and to add some pieces of soft paraffin. The glass is covered and set aside till the paraffin is dissolved. Then the cover is removed, and the glass placed in the incubator, so that the intermediate fluid evaporates. The specimen is next transferred to the mixture of soft and hard paraffin, a few hours' immersion in which suffices to saturate it.

After this the tissue is ready for *Imbedding*. An imbedding frame is formed by placing two L-shaped metal bars on a sheet of glass, or a small paper box is made. In either case the surfaces should be brushed with glycerine to prevent the paraffin from adhering. The tissue is placed in the receptacle, its position carefully noted, and the melted paraffin is poured in. The paraffin must be quickly cooled, in order to secure homogeneous consistence. With this end in view it is immersed in water. The paper or frame having been removed, and the block trimmed, the specimen is ready for cutting.

The stages in imbedding a small, 6-9 mm. long, piece of retina are as follows :—

A. *Saturation with the Intermediate Fluid.*

The tissue is thoroughly hardened and placed in—

1. Absolute alcohol, 10 minutes. This stage is repeated with fresh alcohol.

2. $\left.\begin{array}{ll}\text{Absolute alcohol} & \frac{2}{3}\\ \text{Xylol} \quad . \quad . & \frac{1}{3}\end{array}\right\}$ well mixed, 10 minutes.
3. $\left.\begin{array}{ll}\text{Absolute alcohol} & \frac{1}{3}\\ \text{Xylol.} \quad . \quad . & \frac{2}{3}\end{array}\right\}$ well mixed, 10 minutes.
4. Xylol-paraffin mixture with xylol in excess, 15 minutes.
5. Xylol saturated with paraffin, 15 minutes, or a few minutes in the incubator.

These solutions are kept ready for use in well-stoppered vessels. The absolute alcohol should be frequently renewed.

6. Mixture of hard and soft paraffin contained in a small porcelain vessel, 1-2 hours in the incubator, at 60° C.

Larger pieces of tissue, which, however, should not be more than a few millimetres in thickness, are left in each of the first five solutions for 30 minutes, and in paraffin for 12-24-36 hours.

B. *Imbedding.*

The tissue can be imbedded in a staining-dish which has been breathed upon, or one of the receptacles described above may be used.

$\left.\begin{array}{l}\text{Adjustment of the specimen}\\ \text{Covering with paraffin}\end{array}\right\}$ quickly performed.
Solidification, a few minutes.
Trimming the block.
Mounting the specimen on a firm support by heating the under surface of the block with a hot spatula.

On Cutting Paraffin Sections.

The paraffin block is trimmed into the shape of a cube, and mounted on a piece of wood, or on a metal support, such as is provided with the Schanze microtome. The support is now securely clamped in the object holder The knife should be fixed at right angles to the paraffin block. The sections are cut dry, and as thin as possible. The knife is adjusted so that only its edge comes into contact with the block, and is carried quickly through the paraffin. If the sections tend to curl up into little rolls, they may be prevented from doing so by gentle pressure of a fine brush held in the left hand, or by breathing on the knife and surface of the block. Much depends on cutting the sections at a proper temperature. If this is too low, the sections crumble; if it is too high, they are apt to become folded on themselves. In the former case the knife may be warmed or the microtome placed near the fire; in the latter the block may be surrounded with a piece of gauze surrounded by ether. The sections, as cut, are arranged along the back of the knife.

If serial sections are desired, the block should be trimmed to the shape of a triangle, so that the apex of one section adheres to the base of the next. Long ribbons can be obtained in this way.

Fixing to the Slide.

The sections must now be mounted on slides in order that they may not be injured in the subsequent manipulations. In most cases it is sufficient to spread upon the slide a drop of water containing a trace of alcohol, and to lay the section or sections on this. The slides are then placed in the incubator (30°-35° C.) for 12-24 hours or warmed (without melting the paraffin) over a flame till the water has evaporated. If the incubator is at too high a temperature, the slides may be laid on the top of it for 24 hours. When the tissue has been hardened in chromic acid, Müller's fluid, or osmic acid, the sections require to be fixed to the slide more firmly. For this purpose P. Meyer recommends filtered white of egg mixed with an equal quantity of glycerine ; to this may be added a trace of thymol or a few grains of salicylate of soda, to prevent the development of fungi. A small drop is spread in a thin layer on a slide, and on this the section is laid. Thereafter the slide is warmed, etc.

Staining.

The paraffin requires to be removed before the sections are stained. This is accomplished by immersing the slide in a tube of xylol for one or two minutes. The sections are next treated with—

Absolute alcohol, to remove the xylol.
Alcohol, 90 per cent.
Water (omitted if alcoholic stains are used).
Staining fluid (carmine, hæmatoxylin, etc.)
Water.
Alcohol, 90 per cent.
Absolute alcohol, xylol, Canada balsam.

The re-agents are poured over the section as it lies on the slide.

The process is thus similar to that followed in the case of celloidin, the only difference being that the binding substance, the paraffin, must be removed, and, since the xylol employed for this purpose is not miscible with water, the sections must be treated with absolute alcohol. Further, absolute alcohol, which ought to be avoided in the case of celloidin, may be used to complete the dehydration of the sections. Of course, a counter stain may be employed if desired.

III. MOUNTING IN GLYCERINE.

Glycerine is a clearing agent, and, since it does not evaporate or change its chemical constitution, it is adapted for mounting permanent preparations. It is less suitable for fresh material, as it renders this too transparent. On the other hand, it is a very good medium to adopt for the examination of unstained sections of hardened tissue. It possesses the advantage of being less highly refracting than Canada balsam. Unstained sections are thus more apparent in glycerine than in balsam. Again, it is chosen for mounting sections which must not come into contact with alcohol after having been stained. Lastly, it is used for mounting very fine tissues or particles, *e.g.*, teased preparations, which cannot undergo the manipulation of staining, dehydration, etc. It is thus adapted for mounting the rods and cones and other retinal elements which have been hardened and isolated in osmic or nitric acid.

The sections may be transferred directly from water or salt solution into glycerine.

The teasing should be performed in glycerine. Pure glycerine is generally employed, more rarely diluted glycerine (10 parts of glycerine to 50 of water). If it is intended to preserve the preparation for any length of time, the cover-glass must be securely fixed to the slide so as to exclude the air. This is accomplished by ringing the cover-glass with cement. Any superfluous glycerine about the edge of the glass is removed by means of a rag moistened with absolute alcohol. The margins of the cover may then be sealed by drawing the wick of a newly extinguished wax taper along them. A better method, however, is to paint the margins of the cover-glass with a layer of glycerine-jelly, and over this to apply a coat of asphalt varnish or Krönig's cement.

Beale recommends a jelly consisting of equal parts of isinglass and glycerine. The cement may be purchased from the dealers.

(*To be continued.*)

CURRENT LITERATURE.

NOTE.—Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—COMPARATIVE ANATOMY, PHYSIOLOGY, AND PATHOLOGY.

(1) Hess, Carl.—Comparative studies concerning the influence of the accommodation on the ocular tension in vertebrates. *Archives of Ophthalmology*, March, 1911.

(2) Clarke, R. H. and Henderson. E. E.—Atlas of photographs of sections of the frozen cranium and brain of the cat (*felis domestica*). *Journal für Psychologie und Neurologie*, Bd. XVIII, 1911.

(3) Porcher, C. and Busquet, H.—Investigations upon the antagonism between mydriatics and myotics. (Recherches sur l'antagonisme entre les mydriatiques et les myotiques.) *La Clinique Ophtalmologique*, 10 décembre, 1911.

(4) Franz, Victor.—Studies in the comparative anatomy of the mammalian eye. (Studien zur vergleichenden Anatomie der Augen der Säugetiere.) *Arch. f. vergleichende Ophth.*, Bd. II, SS. 180 and 269.

(5) Keil, R.—Tubercle of the right eye in an ox. (Rechtsseitige Augentuberkulose beim Rind.) *Arch. f. vergleichende Ophth.*, Bd. II, S. 323, 1911.

(6) Richter, Hans.—A contribution to the anatomy of the iris of the horse, especially with respect to the regional variations due to the shape of the pupil and the alterations due to its movements. (Beitrag zur Anatomie der Iris des Pferdes mit besonderer Berücksichtigung der durch die Gestalt der Pupille gegebenen regionärer, Verschiedenheiten und der Veränderungen beim Pupillenspiel.) *Arch. f. vergleichende Ophth.*, Bd. II, S. 327, 1911.

(1) By means of Hering's micromanometer, **Hess**, of Würzburg, has tested the changes, if any, in tension caused by the electric stimulation of the intrinsic muscles of the eye, causing accommodative changes in various animals. He found that there was an increase of tension in birds and reptiles, but not in monkeys and dogs, and that this took place at the instant of stimulation, and ceased quickly when the stimulation was discontinued. The eyes used had been enucleated within half an hour from the time of the experiment. By means of Wessely's apparatus, his results had been

graphically delineated. The play of the pupil due to light changes was shown to have no effect whatever on the ocular tension. The lack of increased tension in dogs is not due to the weak power of accommodation in these animals, because increased tension occurs in night birds, which have a still weaker power of accommodation. ROSA FORD.

(2) This article by **Clarke** and **Henderson,** of London, which, although appearing in a German publication, is printed in English, is the first instalment of a complete work which the authors are preparing. They consider that the limits of research upon cerebral localisation by the present methods appear to be in view, and it will now be necessary to apply Marchi's procedure to the deeper areas of the brain. This can be achieved by the use of an insulated electrolytic needle. In order to apply such an instrument to any selected spot in the brain, an accurate system of cerebral topography is essential. When such a scheme has been elaborated, it will be possible, by using a stereotaxic instrument (invented by Clarke) to introduce the needle in such a way that a stimulative or destructive lesion can be effected at any spot chosen.

The brain is charted with reference to three primary planes all at right angles to each other. Each plane is divided up into squares, which by a special gauge, are calibrated proportionally to the size of the cranium dealt with.

The basal horizontal plane lies along a line from the centre of the auditory meatus to the lower margin of the orbit. For convenience, the primary plane is drawn parallel to the basal plane at an empirical distance above it, a distance which varies according to the species of the animal used.

The brain is frozen with carbon dioxide snow. Each brain is drilled through the meati and at another spot above it, these drill holes are then permanently stained with lamp black, and form two known fixed spots in each section from which all measurements are oriented. The whole skull and brain are now cut into sections, each 2 mm. thick. To obtain a complete series, three heads must be used, for the set of the saw destroys 1 mm. of tissue. The sawing machine and other instruments employed are described and illustrated in the paper. The major portion of the communication consists of a series of plates, photographs of sagittal sections of the cat's brain. In process of time a further issue will appear containing transverse and horizontal sections. When the authors have completed the topography of the cat's brain, they propose to attack the monkey's cranium in the same way.

We congratulate the authors upon the valuable service they are rendering science, and express the hope that the whole series of plates will be collected together to form an atlas of cerebral topography. The subject is of interest to the ophthalmologist, because at present the localisation of the various functions in the brain, and the ultimate connections of the visual tracts and of the reflex arc, are by no means accurately determined. There is a wide divergence of opinion upon even such a comparatively simple question as the cortical localisation of the various visual acts. T. HARRISON BUTLER.

(3) **Porcher** and **Busquet,** of the Veterinary School at Lyons, have investigated in animals the antagonism between eserine and several mydriatics. Shortly, they found that eserine was able to neutralize the dilated pupil of cocaine, euphthalmine, and ephedrine, while it failed to do so when the pupil had been dilated by atropine, hyoscine, scopolamine, and eumydrine. It is worth while drawing attention to the fact that a strong solution of eserine salicylate induced myosis when used at least twenty-four hours after atropine had been placed in the eye or injected beneath the skin.

SYDNEY STEPHENSON.

(4) Although eyes from members of all the main orders of mammals have been examined with some frequency, yet in certain cases the numbers have been insufficient to show, beyond doubt, whether the peculiarities observed were individual, or belonged to whole species. In this respect the mammalia have been almost more neglected than the lower orders, although some divisions of them have been well worked out, as for instance the water mammals by Pütter; certain of the tissues also, as the lens and the retina, have been the subject of extensive comparative researches.

In the first part of the present paper the mammalian orders are taken *seriatim* and a comparative description of the macroscopic and rough microscopic characters of the eye in each is given. Fine points of histology are not entered into. This section is full of interesting and important facts, but scarcely lends itself to a detailed review. In the second part, the *data* are collated, an attempt is made to account, on biological or morphological grounds, for some of the structural details, and some conclusions are drawn.

With regard to shape, a globe with its vertical axis shorter than its horizontal, is found in many of the ungulates. This form of eye is presumably associated with an extension of the lateral limits of the field of vision, and might perhaps be expected in animals which never leave the ground and which probably require an extensive field rather than high visual acuity. It is doubtful, however, whether this can be the sole determining factor, for the same shape occurs in birds, and although their eyes are much less freely movable than those of mammals, and might therefore stand in need of some such device for increasing the field, this is probably fully compensated for by the free mobility of their heads. Moreover, not all ungulates have horizontally elongated globes – in the pig, tapir, rhinoceros, and elephant, for instance, it is round.

When the eye is horizontally elongated, the cornea is also horizontally elliptical; but in some cases the horizontal axis of the cornea is the longer, although the globe is spherical. In the camel the cornea is nearly twice as broad as it is high. This is perhaps explicable as a device to give the largest possible field without interfering with the movements of the globe.

The antero-posterior axis of the globe is also relatively short in ungulates. Elongation of this axis (telescopic eye) is probably usually associated with high visual acuity, and is found, often with a very large cornea, in animals of nocturnal habits, as, for instance, in the lemur, some of the felidæ, and the bat. The eyes of nocturnal animals are large, and seem larger than they really are because of the telescopic form of the globe. The size of the cornea is not always easily explicable. The marmot, living in high regions where there is plenty of light, has a small cornea; on the other hand, the chamois, in much the same environment, has a large one, perhaps in order to give it the periscopic vision necessary to its active life.

The shape of the pupil usually conforms with that of the cornea. In some night animals the sphincter iridis is very weak. In the pinnipedia it is very powerful. The dilatator is well developed in the seal.

The ciliary body is usually better developed temporally than nasally. Animals which have an elongated cornea and iris must have a round ciliary body because of the shape of the lens; in this case the ciliary processes not infrequently trespass on the back of the iris in the horizontal meridian. In beasts of prey the ciliary processes are comparatively flat; in herbivorous animals more prominent and complicated: the reason for this does not seem to be well understood. The number of processes is often less, not only absolutely, but also relatively in small eyes. The ligamentum pectinatum is composed of strong fibres in the ungulates, and is very extensive in the seal.

An ora serrata is almost confined to man, though traces of it may be detected in the elephant, rhinoceros, giraffe, and horse. It does not seem to have any biological significance, but appears to be due to mechanical factors during development and growth, and is probably to be brought into special relation with the powerful accommodation of man. Radial and circular fibres in the ciliary muscle are scarcely found except in man.

According to **Franz**, the mechanism of accommodation must be the same throughout the whole mammalian series ; he believes that the structural *data* strongly support the theory of v. Helmholtz.

The sclera is, of course, thicker in large eyes. It is also very thick when the eye is comparatively small in proportion to the body, as in the elephant and rhinoceros. Its great thickness in the whales may be due to the necessity of resisting great hydrodynamic pressure when the animal dives deeply. The presence of cartilage in the sclera of echidna is well known, and together with the small cornea, flat lens, and the presence of oil globules in the cones, forms a very important approximation to the avian and saurian type of eye, and is of great biological interest.

Most of the structural peculiarities which have been mentioned, however, are rather adaptations to environment than structures of ontological significance. A good instance of this is furnished by the whales, in which the Denticeta and Mystacoceta, although belonging to widely different biological groups, have yet developed peculiarities in the eyes which diverge greatly from the ordinary mammalian type, but are closely similar in the two divisions.

Many other interesting facts might have been gathered from the plentiful stores contained in this paper, but enough has been said to show that it is both suggestive and full of substance. GEORGE COATS.

(5) In the right eye of a bullock, **Keil** (Leipzig) found conglomerate masses of tubercle involving all intraocular structures. The animal showed general tuberculosis. Tubercle bacilli were demonstrated.

GEORGE COATS.

(6) In the horse the fixation of the iris in a state of mydriasis is comparatively easy, but to study it in myosis is more difficult. The method used by **Richter** (Berne) was to place the anterior part of the globe in water, after removing the vitreous and lens ; within a short time the pupil contracts, probably from direct stimulation of the iris musculature. Richter distinguishes in the iris a central oval portion containing the sphincter—the "functional iris"—and a peripheral portion, bounded on its outer border by the round ciliary attachment—the "resting iris." The functional iris is especially broad above and below, the resting part forms a greater proportion of the breadth of the iris at the sides, where the play of the pupil is least. A full description is given of the macroscopic and microscopic structure of the iris, all the details of which need not be given here. The pupil is slightly eccentric upwards and inwards. The sphincter portion is comparatively smooth, whereas the periphery shows a series of prominences on the anterior surface. In mydriasis, as compared with myosis, the iris is thicker and concave towards the lens ; the pupillary border is turned towards the cornea, and the grape clusters are not quite at the pupillary margin ; the sphincter portion is smaller ; the prominences on the surface are brought together, and there is a general condensation of the tissues. On the temporal and nasal sides, the grape clusters are absent, and the iris is more wedge-shaped, with the thin sphincter portion running off from the apex of the wedge. Elastic fibres are chiefly present in the lateral portions of the iris.

As compared with the iris of the horse, that of the sheep. which Richter has previously studied, shows more radial muscle fibres belonging to the dilatator system. Such fibres are especially plentiful in the sheep at the ends of the oval pupil, where they seem to be replaced in the horse by a mass of fibrous and elastic tissue. In mydriasis the stroma of the sheep's iris takes the form of a single large fold, while that of the horse shows many small plications.

Richter's paper could be greatly improved by drastic condensation.

George Coats.

II.—BACTERIOLOGY.

(1) Dutoit A.—Traumatic pneumococcal panophthalmitis. (Traumatische Pneumkokken-Panophthalmie.) *Zeitschrift f. Augenheilkunde*, Juni, 1911.

(2) Gradle, Harry S.—Simple bacteriological examination of the conjunctival sac. *Ophthalmology*, July, 1911.

(3) Amsler, C.—Clinical, bacteriological, and experimental studies upon croupous conjunctivitis. (Klinische, bakteriologische und experimentelle Studien über die Conjunctivitis Cruposa.) *Zeitschrift für Augenheilkunde*, Juli, 1911.

(4) Salus, R.—Antibodies in the aqueous humour. (Die Immunitätsverhältnisse des Kammerwassers.) *Klin. Monatsbl. f. Augenheilkunde*, September, 1911.

(5) Tschirkowski, W.—The influenza bacillus of Pfeiffer in the pathology of certain eye diseases. (Der Influenzabazillus Pfeifferi in der Pathologie einiger Augenerkrankungen.) *Klin. Monatsbl. f. Augenheilk.*, Oktober, 1911.

(6) Heilbrun, Kurt —A case of keratomycosis aspergillina. Deutschmann's serum in experimental keratomycosis aspergillina. (Ein Fall von Keratitis aspergillinea. Versuche über das Deutschmann-Serum bei experimentaler Keratitis aspergillinea.) *Klin. Monatsbl. f. Augenheilk.*, Oktober, 1911.

(7) Dewatripont, L.—A contribution to the study of the bacteriological relationships between nasal affections and affections of the lacrymal passages. (Contribution à l'étude des rapports bactériologiques entre les affections nasales et les affections des voies lacrymales.) *La Clinique*, 28 octobre, 1911.

(8) Reitsch, W.—Chronic suppurative inflammation of the Meibomian glands caused by Bacillus capsulatus. (Die chronisch-eitrige Entzündung der Meibomschen Drüsen durch Kapselbazillen.) *Klin. Monatsbl. f. Augenheilk.*, Oktober, 1911.

(9) McKee, Hanford.—A new method of making film preparations to demonstrate the presence of the gonococcus. *Ophthalmic Record*, January, 1912.

(10) Marx, E.—Experiments on the retention (latency) of bacilli within the injured eye. [Untersuchungen über Einheilung (Latenz) von Bakterien im verletzten Auge.] von Graefe's *Archiv f. Ophthalmologie*, 3 Januar, 1912.

(1) This paper by **Dutoit,** of Lausanne, is a clinical and pathological study of a case of suppurative hyalitis caused by infection with the pneumococcus in pure culture. - T. HARRISON BUTLER.

(2) Stained films being insufficient for accurate diagnosis, it is desirable to have some simple method of obtaining cultures. Serum bouillon has been found to be a good medium. **Gradle** recommends the following method.—A small amount (1/3-1/2 cc.) of horse serum is placed in a small test tube, and evaporated down to a light-brown film, in an incubator at 37° C. The bouillon is preserved (1-1·5 cc.) in small glass *ampoules*. When the medium is required, the bouillon is added, under proper precautions, to the serum, and solution occurs in ten to twenty minutes. To take a culture from the conjunctival sac, two drops of the culture medium are taken from the tube with a sterile pipette, put into the conjunctival sac, drawn up again, and returned to the culture tube. If no incubator is available, fill a quart "Thermos" flask with water at 40° C., after a few minutes pour half of it out, and suspend the culture tube in the flask by means of a wire attached to the cork. The temperature will not fall more than 2° in twenty-four hours. The medium, under normal conditions, will remain clear or opalescent for forty-eight or sixty hours, but if the pneumococcus or the Morax-Axenfeld diplobacillus be present, its growth will render the medium opaque in twenty-four hours. A. J. BALLANTYNE.

(3) **Amsler**, of Basle, comes to the following conclusions.—Conjunctivitis crouposa and conjunctivitis diphtheritica cannot be distinguished from each other merely by taking account of the presence or absence of the Klebs-Löffler bacillus, but must be separated from each other upon clinical grounds.

The prognosis of croupous conjunctivitis is generally favourable, but the discovery of streptococci and pneumococci, with or without diphtheria bacilli, makes the prognosis more serious.

As a rule, cases of croup of the conjunctiva in which the Klebs-Löffler bacillus can be demonstrated, end in a thoroughly satisfactory manner, even when only simple symptomatic therapy is adopted.

We fancy that few ophthalmologists will accept these views without considerable modification. T. HARRISON BUTLER.

(4) The conclusions reached by **Salus**, of Prague, as the result of his researches on guinea-pigs, are that all antibodies without exception (antitoxins, agglutinins, bacteriolysins, hæmolysins, opsonins, etc.), pass over into the aqueous of the healthy eye from the blood. Where it appears that this transference does not occur, there is merely a quantitative difference in the passage of the different bodies, due, in the first place, to differences in their abundance in the blood, and, in the second place, to difference in the delicacy of the biological reactions by which their presence is recognised.

A. J. BALLANTYNE.

(5) The cases observed by **Tschirkowski,** of Kasan, Russia, in which the influenza bacillus was found to be the pathogenic organism, comprise eleven cases of conjunctivitis, one of hypopyon-keratitis, one of phlegmon of the orbit associated with irido-choroiditis, and one of post-operative infection. In the last case, and in nine of the conjunctivitis cases, no general symptoms of influenza were present. The clinical features of the cases, and the results of the bacteriological examinations, are described at considerable length, and the author succeeds in showing how serious may be the consequences of infection of the eye by this organism. Since infection of the eye may occur independently of a general influenza, it is possible that the influenza bacillus is more often the cause of infective eye conditions than is generally supposed, more especially as culture media containing blood are necessary for its proper recognition. A. J. BALLANTYNE.

(6) **Heilbrun**, of Halle, describes in detail a case of this rare condition, of which only some twenty cases have been published. The patient was a farmer's wife, aged 57. There was no knowledge of an injury. She felt at first pricking in the left eye, and then actual pain. Three days later, the eye was blind. The eye presented a central disc-shaped corneal opacity, 7 or 8 mm. in diameter, the border of which was more infiltrated than the centre, and could be elevated with a needle. The opaque area was anæsthetic. The cornea elsewhere was steamy, but sensitive. There was a small hypopyon, also some chemosis. Cultures showed the aspergillus fumigatus in the infiltrated cornea. The organism grew on agar and Löffler-serum plates, but not on horse-serum bouillon. It infected the lung of the pigeon and the cornea of the rabbit. In Heilbrun's case the disease ran a varied course, but healed in about two months. Deutschmann's serum was of no use, either in the human patient or in experimentally infected rabbits. A. J. BALLANTYNE.

(7) **Dewatripont** gives details of (1) four cases of phlegmonous pericystitis associated with streptococci and of nasal origin, and (2) one case of relapsing phlegmonous pericystitis with streptococci in a patient suffering from chronic purulent maxillary sinusitis. As regards the first group, pneumococci were found to be the cause of the chronic dacryocystitis which in every instance preceded the acute outbreak, although the latter was associated with streptococci. The author considers that the streptococcal infection was an ascending one, derived from the purulent rhinitis. *Apropos* the second group, represented by a single case, Dewatripont remarks that from a bacteriological point of view, the identity of the infective agents in phlegmonous pericystitis and in maxillary sinusitis of nasal origin, leaves no doubt as to the common origin of those affections. SYDNEY STEPHENSON.

(8) **Reitsch**, of Hirschberg, describes the case of a ten year-old peasant girl who had suffered for five years from redness and thickening of the right lower lid. From time to time pustules appeared at different points on the lid margin, but soon disappeared. There was no pain. The conditions, when seen by Reitsch, were as follows.—Diffuse redness and swelling of the lid, especially at its margin. Broadening of the intermarginal space, and rounding of the posterior edge of the lid margin. Swelling and redness of palpebral conjunctiva. No localised thickenings. The orifices of the Meibomian glands were visible to the naked eye as red points, and, when magnified, as slight red ring-shaped elevations, with a gelatinous plug at the centre of each. A pustule of the size of a millet seed lay near the nasal end of the lid margin, and a smaller pustule, near the outer canthus. Compression of the lid forced pus out of the Meibomian glands in form of fine spiral threads. Pustules also emptied through ducts. Signs of irritation were strictly limited to the right lower lid and its palpebral conjunctiva.*

Bacteriological examination of the contents of the glands detected a bacillus of the group B. Capsulatus Mucosus, to which belong Friedländer's bacillus and the bacilli of ozœna and rhinosclera. The same organism was found in the nasal mucus. The author thinks it probable that infection of the eyelid took place from the nose through the finger. The strict limitation of the affected area over a number of years is in keeping with the accepted view that organisms of this group have little power of infecting the conjunctiva and other external parts about the eye. Some pre-existing disturbance must be assumed, in order to account for the successful infection of the glands of the affected lid. A notable characteristic of this disease is its long duration and resistance to all forms of treatment. In

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* Clinically, at all events, this is the same affection as that described by R. W. Doyne in 1910. (*See* THE OPHTHALMOSCOPE, 1910, p. 456).—EDITOR.

Reitsch's case, extirpation of the tarsus was finally employed, after everything else had failed. A. J. BALLANTYNE.

(9) **McKee,** of Montreal, gives a useful "tip" regarding the preparation and staining of material from cases of ophthalmia neonatorum where gonococci cannot be found by the usual means. He recommends, briefly, that the palpebral conjunctiva be gently stroked with an ear curette, and that the material thus obtained be spread over a cover slide. The preparation is then dried in air, fixed for ten minutes in 80 per cent. alcohol, and, finally, stained by the Giemsa method, old or new. SYDNEY STEPHENSON.

(10) **Marx,** of Rotterdam, describes the experiments he made with cultures of staphylococci, streptococci, and pneumococci, which he injected into the vitreous of rabbits or introduced dried on to foreign bodies (iron or silk threads). He found that these micro-organisms could survive for very considerable periods of time, in one case 190 days, while inflammation or suppuration went on; they did not change much morphologically during this period, but their virulence seemed to become generally somewhat attenuated. More important is the question whether they can survive after all the symptoms of inflammation have subsided and become incorporated, but still liable to set up fresh symptoms under the slightest provocation. Marx's experiments establish the possibility of such an occurrence after the introduction of staphylococci and pneumococci, although in rare cases only. It is important to know that neither the external appearance of the eye, nor tension, vision, nor absence of any inflammation enable us to exclude the presence of active germs for many months after an injury has taken place. R. GRUBER.

III.—PATHOLOGY.

(Second Notice.)

(1) **Bergmeister, R.—A contribution to the histology of choked-disc. (Ein Beitrag zur Histologie der Stauungspapille.)** *Zeitschrift für Augenheilkunde*, Januar, 1911.

(2) **Alt, Adolf.—On a benign epithelial growth of the iris.** *American Journal of Ophthalmology*, February, 1911.

(3) **Orlof.—On the pathological anatomy and the pathogeny of congenital microphthalmos with serous cysts of the eyelids. (Sur l'anatomie pathologique et la pathogénité de la microphthalmie congénitale avec kystes séreux des paupières.)** *Ann. d'Oculistique*, mars, 1911.

(4) **Letulle and Duclos.—Adenoma of the glands of Moll. (Adénome des glandes de Moll.)** *Ann. d'Oculistique*, mars, 1911.

(5) **Stähli.—The anatomy of hæmorrhagic glaucoma. (Zur Anatomie des Glaucoms hæmorrhagicum.)** *Archiv für Augenheilkunde*, April, 1911.

(6) **Hack.—A case of eversion of the pigment layer of the iris. (Ein Fall von Eversion des Pigmentblattes der Iris.)** *Archiv für Augenheilk.*, April, 1911.

(7) **Alt, Adolf.—On a case of elastoma of the bulbar conjunctiva.** *American Journal of Ophthalmology*, July, 1911.

(8) **Yorke, Warrington.—The pathology of interstitial keratitis in trypanosomiasis and syphilis.** *Liverpool Medico-Chirurgical Journal*, July, 1911.

(1) **Bergmeister**, Vienna.—The patient had had headache for upwards of two years. Optic neuritis had been present for over a year. The patient died three days after an attempt to extirpate the tumour. The microscopical appearances of the sections were characterised by complete absence of any signs of inflammation, by great œdema of the papilla, and by the development of much intermedial tissue. In contradistinction to the extreme œdema of the papilla, there was relatively little œdema of the nerve trunk. This might be the result of the decompression following trephining. Such œdema as was present in the nerve was found only in its axial portions. T. HARRISON BUTLER.

(2) The histological details in **Alt's** case should be sought in the original.

(3) **Orlof**, of Piatigorsk, gives full descriptions of two cases of congenital microphthalmia associated with orbito-palpebral cysts, developed from the secondary optic vesicle, as shown by the presence of lenses in the eyeballs. In the first case the eye was in a very rudimentary state, showing no trace of cornea, anterior chamber, or differentiated retina; but in the second it was better developed. The literature of the subject is reviewed, and the theories which have been put forward to explain the occurrence of the condition are fully discussed in the article. R. J. COULTER.

(4) **Letulle** and **Duclos** examined microscopically a rounded, smooth, reddish tumour removed from the external third of the ciliary margin of the left upper lid of a woman, aged fifty-four. During the three years before its removal, the tumour had grown from the size of a grain of millet to that of a bean. The specimen was found to consist of a stroma of connective and elastic tissue, containing multiple cystic cavities of variable size filled with glandular processes, and lined with a single layer of epithelium, cubical when lining the cyst but cylindrical on the processes, which were composed of a number of open empty cavities of variable size and shape, lined by a layer of high cubical or even cylindrical epithelial cells with more or less granular protoplasm and a single deeply-staining nucleus near their base. Immediately outside the epithelial cells were fusiform cells, resembling the sub-epithelial fibre-cells of Moll's glands. There was also a fine network of elastic fibres around most of the glandular canals. The entire tumour was surrounded by a capsule consisting of connective and elastic tissue with some smooth muscle fibres which sent a central vascular band into the tumour where it split up to form the numerous septa dividing the tumour into lobules. The authors consider that the non-acinous disposition of the abnormal glands, the presence of smooth muscle fibres, and the more or less complete elastic peri-muscular sheath, show that the tumour originated in the glands of Moll, and they are of opinion that it was a benign adenoma of congenital origin. R. J. COULTER.

(5) This work is a careful histological examination of three cases where the eyes were removed on account of *plus* tension. In all three there were hæmorrhages into the retina and in one into the optic nerve. In one case the retinal hæmorrhages preceded the rise of tension, but whether this was so in the other two cases the history and clinical appearances did not show, although on histological grounds, it appeared to be the case.

Stähli examined the cases carefully by serial sections, paying particular attention to the blood vessels. He came to the following conclusions.—The eyes belonged entirely to the group of hæmorrhagic glaucomas. In every case endarteritis and phlebitis of the central vessels were present. The central artery showed a variable thickening of the intima, with œdematous swelling of the cells of that coat. From this it appeared likely that a temporary blocking could be brought about. Where the lumen was most constricted, there the œdema was greatest. The central vein showed severe sclerosis and contraction of the lumen. In all vessels the endothelium was intact, and so for this reason thrombosis was not found. Not only were the retinal vessels sclerosed, but also the choroidal vessels and those of the iris and ciliary body. Never had rupture of the vessel walls taken place, and so the hæmorrhages for the most part must have been due to diapedesis. R. BEATSON HIRD.

(6) Isolated rupture of the pigment layer of the iris due to contusion of the globe is rare. Gelpke was the first to record a case, which followed a perforating wound of the eye due to a metal splinter. Cases have been reported by Boerma, Pohlenz, and Eisenhuth.

Hack records a case fully. His patient was a young man who came for spectacles. It was noticed in the left eye that there was a black thread projecting from the pupil into the anterior chamber, its attachment being to the pupil margin. With the binocular corneal lens, this was seen to consist of a number of nodular fibres which moved when the globe was rotated and which were clearly attached to the posterior surface of the iris. Just external to this a knob of iris pigment projected into the pupil. Two excellent coloured drawings are given. The lens was slightly opaque in this region. There were opacities in the vitreous and foveal changes. The eye had 12 D. of myopia. The right eye was normal except for a similar amount of myopia. The left eye had been injured by a straw helm.

The pigment thread was derived from the pigment layer of the iris, as shown by transillumination, a large area of the pigment layer of the iris being absent from its region. This defect was not visible by means of the ophthalmoscope.

Hack believes that the pigment layer of the iris was detached by the straw, except at the pupil margin, and the detached portion was carried through the pupil by the aqueous current. The changes at the yellow spot were the result of the myopia, and not of the injury; but the vitreous opacities were due to a hæmorrhage at the time of the injury.

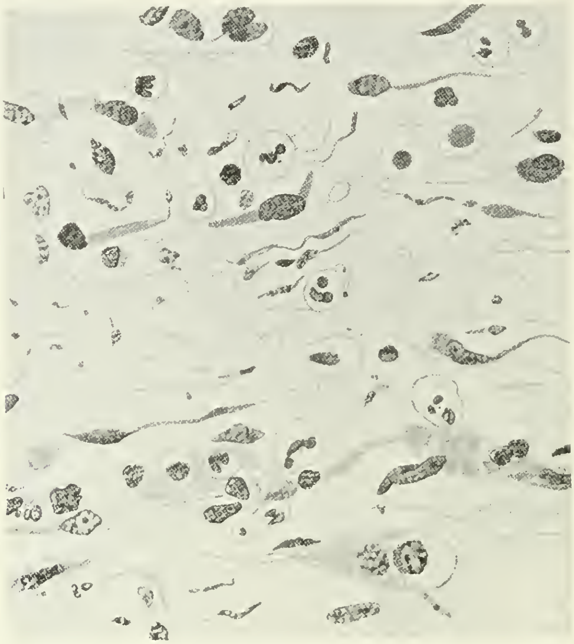
With glasses, the vision was: right 3/5 and left 2/5. Hack urges the importance of examination by means of the Sachs lamp to clear up the diagnosis. R. BEATSON HIRD.

(7) **Alt**, of St. Louis, reports an interesting case.—A female patient of forty-six years, consulted him on account of a growth on the temporal side of the bulbar conjunctiva. Alt found this to be a lobulated, whitish, pearly-looking, small tumour situated about 3 mm. from the temporal side of the cornea. It was 5 mm. long and about 1.5 mm. wide, with its long axis at right angles to the horizontal meridian. There was a slight amount of injection in the conjunctiva surrounding it. The tumour was slightly movable with the conjunctiva. It was not like a pinguecula, and was too far from the cornea for that. Alt suspected epithelioma, and therefore removed the tumour and cauterised the base. On section, it was found not to be epitheliomatous but fibrous, and on staining with orcein, the whole tumour was found to consist of elastic fibres, no other tissue entering into its make-up.

ERNEST THOMSON.

(8) This communication by **Yorke**, of Runcorn, Liverpool, is devoted to showing that the interstitial keratitis of trypanosomiasis and of syphilis is due to the local multiplication of the specific parasite, and is not a mere trophic or toxic manifestation of the disease. The chain of proof is not complete as regards syphilis, since the treponema pallidum has not yet been demonstrated in the cornea affected with syphilitic inflammation. The disease, however, has been produced experimentally by inoculating the eyes of apes (Greeff and

Clausen) and of rabbits (Hoffmann and Brünig) with syphilitic material. As to trypanosomiasis, the proof is complete. In that disease, as well-known, a form of extremely transient interstitial keratitis in animals may be induced by infection with trypanosomes. Three goats and a horse inoculated in this way by Yorke developed interstitial keratitis, and the corneæ of these animals (removed immediately after death) were examined microscopically. In the corneæ, which were more or less completely opaque at the time of the animals' death, trypanosomes were found in the substantia propria. Their number was proportionate to the density of the opacity. Other pathological changes included thickening and œdema of the substantia propria, polymorphonuclear and mononuclear infiltration, and the formation of vessels, together with the escape of erythrocytes from the last-named. Yorke reconstructs the sequence of events somewhat as follows.—In the early lesions, trypanosomes are present in the tissues, and as a consequence, there is an œdematous condition of the affected part, together with a more or less marked degree of leucocytic infiltration. Later, the morbid condition becomes more accentuated, as the number of parasites increases. Leucocytes are poured into the tissues and new blood-vessels develop. After a time, with the disappearance of the parasites, there is a tendency on the part of the tissue to recovery.



DESCRIPTION.

Left cornea of goat 1. Fixed with Flemming's solution. Stained by Heidenhain's iron alum hæmatoxylin method. Drawn with Abbé camera lucida, 2 mm. apochromatic objective, and No. 8 compensating ocular (Zeiss). Magnification 1000 diameters. (The reproduction is half the size of the original drawing and is therefore magnified 500 diameters.)

Considerable œdematous infiltration of the substantia propria. In the distended interstitial spaces are large numbers of trypanosomes. The parasites are cut in various directions, some transversely and others obliquely, whilst still others are lying horizontally in the plane of the section.

There is also considerable infiltration of polymorphonuclear and mononuclear leucocytes. Two small blood-vessels are seen in the lower portion of the drawing.

SYDNEY STEPHENSON.

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(Extract.)

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IV.—A SUBSTITUTE FOR THE VITREOUS HUMOUR.

(1) **Elschnig, A.—On vitreous substitutes. (Ueber Glaskörperersatz.)** *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1911, S. 11.

(2) **Löwenstein, Arnold, and Samuels, Bernard.—On the replacement of the vitreous. (Ueber Glaskörperersatz.)** von Graefe's *Archiv f. Ophthalmologie*, 3 Januar, 1912.

(3) **Elschnig, A.—On replacement of the vitreous. (Ueber Glaskörperersatz.)** von Graefe's *Archiv f. Ophthalmologie*, 3 Januar, 1912.

(1) Removal of part of the vitreous in rabbits is followed, in a large number of cases, by ablatio retinæ, and often by the formation of dense membranes. If, however, the loss of vitreous be made up with physiological salt solution, this does not happen.

Elschnig, of Prague, has made use of this experimental evidence to initiate a new treatment for cases of vitreous opacity following hæmorrhage and other conditions. He aspirates about 0·5 c.cm. of vitreous and replaces it by normal saline. The results have been most satisfactory. In cases following irido-cyclitis he has been less successful.

The operation is performed as follows.—A radial incision is made in the conjunctiva in the outer-lower quadrant and the sclera laid bare. A suture is led through the two edges of conjunctiva and through the episclera on each side of the site chosen for puncture, but not tied. The vitreous is removed by a special lancet-shaped canula, and the required amount of saline injected. The suture is tied, and the canula removed rapidly.

In the discussion it was pointed out that it was often possible to save an eye, after extreme loss of vitreous, by injecting normal saline.

T. Harrison Butler.

(2) **Löwenstein** and **Samuels**, of Prague, have been experimenting on the rabbit, and although the physical structure, and especially the viscosity of the vitreous humour in those animals, differ from the human condition, the results are very interesting. The authors find that after withdrawing small quantities up to 0.4 c.cm., the whole amount in the rabbit is approximately 1.0 c.cm. The transparency of the vitreous remains, as a rule, unimpaired. If more is lost, the result is generally extensive hæmorrhage with consecutive organisation and rupture of the retina ; but the result is less serious if the loss be made up by the injection of saline. The osmotic character of the replacing solution is very important, the best results being obtained with a solution of 0.85 per cent. sodium chloride, which is isotonic with the substance of the vitreous humour. Saline injections seem to scatter the remains of the vitreous, which, with the ophthalmoscope, is seen to contain shiny flakes, somewhat resembling synchysis scintillans. There is no evidence of circulation of vitreous fluid into the anterior chamber, even after the aqueous humour has been withdrawn.

R. Gruber.

(3) This paper by **Elschnig**, of Prague, based on the experimental researches of Löwenstein and Samuels (*see* above), is of great practical importance and interest. His idea is to replace the morbidly altered vitreous, especially in serious hæmorrhage, by a fluid which in transparency and albuminous consistence more nearly approaches the normal condition. He has noticed that, as a rule, it is not the blood in itself which seriously interferes with the translucency of the vitreous, but the formation of plasma of different refracting power and richer in albumen, which with a very insignificant addition

of blood-corpuscles suffices to produce the ophthalmoscopic appearance of complete hæmorrhagic imbibition of the vitreous. On aspiration, this fluid appears almost clear, or only slightly tinged with yellow or green and a trifle turbid. Elschnig proposes to withdraw part of the diseased vitreous and to replace it by an equal amount of sterile isotonic saline solution (about 0·85 per cent.). Not more than 0·5 c.cm. of the saline should be injected, especially since the operation can be repeated without danger. The *technique* of the operation, which is very important, is not quite easy.—The principal difficulty centres in the canula, which is, of course, very liable to get blocked, Elschnig uses a canula with a wide stiletto-pointed opening with an *arrêt* 12 mm. above the point and a wide flat wing to allow of easy removal of the syringe. Even so, blocking not unfrequently occurs, when a sterile mandrin must be used. The details of the operation are as follows.—Careful fixation of the eyeball, if necessary, by means of a temporary bridle-suture through two recti muscles. Exposure of the sclera downwards and outwards and insertion of a suture about 12 mm. from the limbus; this should comprise the inner edge of the conjunctiva, sclera, and then out through sclera and conjunctiva, and the thread is pulled up between the two scleral insertions where the canula is to be thrust through. This is to enable the surgeon to close the wound rapidly after the completion of the injection, so as to prevent any unnecessary loss of either vitreous or saline, a thing which is extremely likely to interfere with the success of the operation. Rest in bed for eight days after the operation is essential.

Elschnig reports on about twenty cases, and although there are, of course, some failures, mostly in old iridocyclitis, retinal detachment, etc., where the operation was of the character of a forlorn hope, its success in some cases was extremely satisfactory and almost marvellous, especially in a case of inveterate vitreous hæmorrhage, where all other treatment had failed, and where vision was by these means raised from perception of the movements of the hand to 0.8 of the normal. It remains to be seen how far the indications for "replacement of the vitreous" extend. Elschnig thinks that at present the operation will be of undoubted benefit in bad vitreous hæmorrhage with persistent obscuration; perhaps also in injury with great loss of vitreous, and in non-suppurative infiltration after penetrating traumatism and foreign bodies. It also seems as if retinitis proliferans would be beneficially influenced by this operation.

R. Gruber.

V.—OPHTHALMOLOGY AND GENERAL MEDICINE.

(Second Notice.)

(1) Krämer, R.—On the fundus in morbus coeruleus. (Ueber den Augenhintergrund bei Morbus coeruleus.) *Zeitschrift für Augenheilkunde*, Januar, 1910.

(2) Gowers, Sir William.—A clinical lecture on gonorrhœal retro-ocular neuritis and myelitis. *Medical Press and Circular*, 9th March, 1910.

(3) Rönne, Henning.—Does optic atrophy in tabes develop from a disease of the ganglion cells, or from the nerve fibres? *Ophthalmology*, April, 1910.

(4) Brinton, A. S.—Eye symptoms in connection with the diagnosis of general medical and surgical affections. *Transvaal Medical Journal*, May, 1910.

(5) Cobbledick, A. S.—Some ophthalmic conditions caused or influenced by diseases of the upper respiratory tract. *British Medical Journal*, 28th May, 1910.

(6) Nakaizumi, J.—Abscess in the optic nerve and papillitis due to meningitis. (Sehnervenabszess und Stauungspapille infolge von Meningitis.) *Klin. Monatsbl. f. Augenheilkunde*, Mai-Juni, 1910.

(7) Ronnaux, L.—Optic neuritis of menstrual origin. (Les névrites optiques d'origine menstruelle.) *Recueil d'Ophtalmologie*, juin, 1910.

(8) Langenhan.—Herpes zoster ophthalmicus accompanied by isolated abducens paralysis on the same side. (Herpes zoster ophthalmicus mit gleichseitiger isolierter Abducenslähmung.) *Zeitschrift für Augenheilkunde*, Juni, 1910.

(9) Féjer, J.—The influence of pregnancy and labour upon diseases of the eye. *Archives of Ophthalmology*, July, 1910.

(10) Schieck, Franz.—The significance of degenerative changes in the macular region as found in albuminuric retinitis. (Die Bedeutung der für Retinitis albuminurica typischen Degenerationsherde in der Makulagegend.) *Klin. Monatsbl. f. Augenheilkunde*, August, 1910.

(11) Oliveres, A.—On some arthritic ocular conditions. (Ueber einige arthritische Augenbefunde.) *Zeitschrift für Augenheilkunde*, September, 1910.

(12) Roche.—The ocular lesions in variola. (Les lésions oculaires dans la variole.) *Ann. d'Oculistique*, octobre, 1910.

(13) Kiehle, Frederick A.—Vision and the menopause. *Ophthalmology*, October, 1910.

(14) Lurie. — Bilateral plastic iritis complicating erythema nodosum. (Doppelseitige plastische Iritis bei Erythema nodosum.) *Zeitschrift f. Augenheilkunde*, November, 1910.

(15) Bourland.—A case of double optic neuritis accompanying pyæmia. (Un cas de névrite optique double suite de pyémie.) *Ann. d'Oculistique*, novembre, 1910.

(16) Klingmann, Theophil.—Visual disturbances in multiple sclerosis: their relations to changes in the visual field and ophthalmoscopic findings. Report of twelve cases. *Journal of Nervous and Mental Diseases*, December, 1910.

(17) Risley, S. D. — Ocular affections in cardio-vascular disease. *Therapeutic Gazette*, December 15th, 1910.

(1) **Krämer**, of Vienna, describes a typical case of cyanosis retinæ in a boy with kyphoscoliosis who had suffered from rickets. The *post-mortem* examination showed marked stenosis of the pulmonary artery and communication between the right and left auricles and ventricles. A coloured plate of the fundus shows the nature of the changes in the vessels. T. HARRISON BUTLER.

(2) **Gowers'** case, which formed the subject of a clinical lecture, was that of a man, of 22 years, who, after the subsidence of his first gonorrhœa—which had run quite a mild course—developed a retro-ocular neuritis with decided intra-ocular changes, and later on became paraplegic. No other possible cause for the ocular and spinal symptoms could be ascertained. Vision was affected in all parts of both fields, but the central defect was most marked. The explanation assumed by Gowers as probable is that gonococci were deposited on the optic chiasma and adjacent nerves. They would there excite an inflammation which would spread along the optic nerves to the retina. It was also assumed that the patient had another collection of gonococci on or in the spinal cord, which accounted for the paralytic symptoms which came on afterwards. At the time of writing there had been no verification of the diagnosis, because, as it is quaintly put by Gowers, "the patient is still with us." Anti-gonococcal serum (Parke Davis) had no definite effect, but it was used too late to render its inefficiency a matter of very much surprise. The Wassermann reaction was negative. Mercury had no effect on the conditions present. ERNEST THOMSON.

(3) In the *Archiv für Ophthalmologie*, Bd. LXXI, **Rönne**, of Copenhagen, called attention to a peculiarity of the visual fields in certain diseases of the eye, especially glaucoma, wherein the edge of the field runs for a certain distance along the nasal horizontal meridian, *i.e.*, in a line corresponding to the *raphé* along which the nerve fibres, having encircled the fixation point, meet on the horizontal temporal meridian. This form of field defect is frequently found in cases of tabetic atrophy, and instances are even found in which the field resembles that of glaucoma, with marked nasal contraction and a bow-formed defect reaching to the blind spot. Since this form of visual field defect corresponds to a nerve fibre distribution, Rönne takes it as evidence that the atrophy affects the nerve fibres before the ganglion cells are involved. A. J. BALLANTYNE.

(4) This paper was read by **Brinton**, of Johannesburg, to the South African Medical Congress at Durban, in August, 1909. It follows the usual lines of such papers, and calls for no special comment. The author states that when examining cerebral cases for optic neuritis, no mydriatic should be used, for should the disease cause loss of visual acuity, the ophthalmologist will be blamed. Such reasons appear futile, and are not consistent with the highest principles of the profession. An *adequate* examination should be made, and a mydriatic is often necessary. A small patch of choroiditis, or a small hæmorrhage near the macula, can easily be overlooked if the pupil be small and undilated, and the whole diagnosis and prognosis may depend upon this minute lesion. We well remember dilating a pupil in a case of headache, quite as an after-thought. A small hæmorrhage was discovered close to the macula, which had been overlooked. Enquiry elicited a history of polyuria. The patient, who had no idea that she was ill, died in six weeks of uræmia.

T. HARRISON BUTLER.

(5) This article by **Cobbledick**, of London, amounts to a plea for a further recognition by the ophthalmic surgeon of the value of a knowledge of the nose and the accessory sinuses. The conditions specially considered are the relationship of adenoids to corneal ulcer and refractive errors in children, the bearing of nasal conditions on dacryocystitis and on conjunctivitis and blepharitis in children, and eye affections caused by nasal disease (*e.g.*, optic neuritis caused by sphenoidal disease). Further, the author holds that eye operations should be preceded by a careful examination of the nose and mouth, as well as of the nasal duct, sac, and conjunctiva. No operation on the eye should be undertaken if pyorrhœa alveolaris is present. "The

condition of the operator's mouth and nose must also be considered in this connection; carious teeth, pyorrhœa, or nasal trouble, including acute coryza, should be looked upon as a possible source of infection, and precautions taken; speaking during the operation should be forbidden for obvious reasons."

The article is illustrated by two figures showing dissections of the accessory nasal sinuses from the anterior cranial fossa. ERNEST THOMSON.

(6) The earliest symptoms in the disease of **Nakaizumi's** patient were headache, fever, and sudden blindness of the right eye. The optic disc of the latter was much swollen and covered with hæmorrhages, whereas the left eye was normal in every respect. Symptoms of meningitis, the cause of which remained obscure, became more and more pronounced. A few days before death, the swollen disc assumed a brilliant white colour, and the rest of the fundus, the appearance of embolism of the retinal artery. This was followed by œdema of the lids, exophthalmus, and other changes indicating panophthalmitis of the right eye. The autopsy showed the right half of the base of the brain covered with pus, in which staphylococci were determined. Pus also flowed from the cut right optic nerve, which was not completely removed for examination. Two large confluent abscesses were found in the nerve, and a third in the dural sheath. But apart from the latter, the intervaginal space was remarkably free from inflammation, a circumstance suggesting metastasis rather than extension by contiguity as the cause of the ocular complication. C. MARKUS.

(7) **Ronnaux** reports three cases in which optic neuritis resulted from disturbances of menstruation:

The first case was that of a previously healthy woman, 30 years of age, whose sight rapidly failed during metrorrhagia brought on by emotion. Vision was reduced to 1/3 in the left eye, and there was no P.L. in the right. Central scotoma in the left eye. Fundi normal. Vision immediately improved on arrest of the hæmorrhage after thirteen days. R.V.= 1/50 and central scotoma: L.V.= 1/3 but no central scotoma. Scotoma disappeared and vision improved to 2/3 in each eye when regular periods were established.

In the second case, a woman, aged 30, had almost constant loss of blood for six months. She suffered from headaches, giddiness, and anæmia. R.V.=1/10, L.V.= counting fingers at 50 cm. Ophthalmoscopically: the fundi presented the appearance of albuminuric neuroretinitis, with retinal hæmorrhages and exudates. Central scotoma in each eye. Uterine treatment arrested the metrorrhagia, and the retinal hæmorrhages and exudates disappeared. Neuritis subsided and vision improved to R. 1/3, L. 1/10. Patient still under treatment.

The third was a woman, 28 years of age, who developed pains in the head and a black spot before the sight on the sudden stoppage of menstrual flow. Her eyelids were swollen and red and the conjunctiva was infiltrated. R.V. = counting fingers at 50 cm. Pupil dilated. Central scotoma. Fundus normal. L.V.=1/10. Central scotoma. Fields full. Three days later, the headaches, congestion of lids and conjunctiva increased, and vision was completely lost. The fundi showed papillary œdema and stasis with retinal hæmorrhages in the right eye. In another three days the menses were re-established and the headache and swelling and congestion of the eyes abated. L.V. = perception of shadows in the external part of the field. R.V. = still no P.L. Twelve days later: R.V. = fingers. L.V. = 1/20. Retinal hæmorrhages had disappeared and the papillary œdema and stasis were much reduced. All signs gradually disappeared, and in four months vision had returned to normal.

Ronnaux is inclined to the view that the neuritis in these cases is of toxic origin. J. JAMESON EVANS.

(8) **Langenhan**, of Berlin, describes a case of a man who had suffered from syphilis who developed severe trigeminal neuralia, which was followed by herpes ophthalmicus. The cornea was unaffected, but after a short time, the sixth nerve became paralysed. The condition cleared up under iodide. T. HARRISON BUTLER.

(9) **Féjer,** of Budapest, reports an interesting case of myopia which had increased greatly after each confinement. In a fourth pregnancy, he advised abortion at two months. No increase of myopia took place during the next three years. The author considers chronic nephritis with retinitis as unqualified indications for the termination of the pregnancy, since the nephritis may completely recover. In choked disc abortion is also useful, and in purulent keratitis. ROSA FORD.

(10) **Schieck,** of Göttingen, reports twelve cases which, in the absence of albuminuria, showed changes in the fundus that are usually considered as characteristic of albuminuric retinitis. The star-shaped figure in the macula, without other changes, occurred in four patients, twice in one eye and twice in both eyes. In three of these cases the cause of the eye-changes remained quite obscure, in the fourth Korsakoff's disease was present. In this last patient the changes, which were bilateral, disappeared in the course of a year without leaving a trace. In a second group of four cases the macular changes were combined with retinal or subretinal exudation or with optic neuritis. In two of these, complete disappearance of the degenerative changes was again observed. In the last group were four cases of choked disc caused by cerebral lesions and accompanied by white foci in the macula. C. MARKUS.

(11) **Oliveres,** of Tortosa, believes that muscæ volitantes are generally due to gout, and can be cured by appropriate anti-arthritic treatment. He holds the same views with regard to ophthalmic migraine. T. HARRISON BUTLER.

(12) **Roche** carefully watched the eyes of 660 patients suffering from small-pox during the epidemic of that disease at Marseilles in 1906-1907. He found pustules on the eyelids, accompanied by considerable œdema, as would be expected from the lax nature of the tissues. These pustules occasionally reached the margin of the lid, causing permanent loss of the eyelashes, but they never spread to the conjunctiva. Conjunctivitis, usually due to staphylococcal infection,was common,and there were four cases of subconjunctival hæmorrhage, in two of which the small-pox proved fatal, while in the other two it ran a normal course to recovery. There were two cases of slight iritis, both of which commenced on the 27th day after the appearance of the rash. Lesions affecting the cornea occurred in 17 cases, in 7 of which the eye affected was lost, but 4 of these had become hopeless before the appointment of an oculist. These lesions occurred as late keratitis due to secondary infection and might be rendered less frequent by preventive treatment. As a rule, they healed if treatment was commenced in time. Roche has never seen a small-pox pustule on the conjunctiva, and in this respect his experience differs from that of some other observers. R. J. COULTER.

(13) **Kiehle** is impressed by the fact that certain women, at or near the menopause, who have no abnormality of ocular media or fundi, no lid irritation and no heterophoria, and who have received careful correction of any refraction errors which may be present, yet continue to complain of subjective symptoms referable to the eyes. These symptoms were itching and burning of the lids, lacrymation or unusual dryness of the eyes, dimness of vision, especially in artificial light, floating bodies before the eyes, muscular

pain, photophobia, flashes of light, and sensations of fulness in the eyes and head. He quotes from Howard Kelly to the effect that the disorders of the menopause are chiefly due to disturbance of the vaso-motor and nervous systems. The menopause begins about the time when presbyopic symptoms are setting in. The latter may be accentuated by the neurasthenic state, and the ocular symptoms of the menopause might be explained as due to vaso-motor changes and increased reflex irritability. They are purely functional. Related to the symptoms in question are the ocular symptoms which some women and girls, especially such as have dysmenorrhœa, suffer from at their periods. The treatment must include the correction of refraction errors, especially presbyopia. The prognosis is hopeful, but it is possible that the symptoms may persist as part of a continued neurasthenia.

A. J. BALLANTYNE.

(14) **Lurie,** of Kiep, describes a case in which a bilateral iritis was associated with erythema nodosum. He says that iritis is a frequent complication of acute rheumatism. This may be a fact in Russia, but, as well known, iritis is very seldom seen in Western Europe complicating rheumatic fever. T. HARRISON BUTLER.

(15) **Bourland** records the case of a soldier who during the course of an attack of pyæmia, with formation of abscesses in the thigh and elbow, complained of defective vision and diplopia. On examination, he was found to have slight optic neuritis in both eyes and paralysis of the right external rectus. Under treatment with mercurial inunctions in the temple and brow, leeches to the mastoid region, and subconjunctival injections of sublimate, the ocular symptoms disappeared in a couple of weeks, but the improvement in them coincided with the recovery of the patient from his general disease.

R. J. COULTER.

(16) **Klingmann,** of Ann Arbor, Mich., holds that visual disturbances are much more common in multiple sclerosis than in any other disease of the nervous system, except cerebral tumour. His excellent paper on this subject, and in support of this view, must be read in the original to be appreciated. We shall content ourselves with a single quotation:

"In true multiple sclerosis early in the disease the most frequent symptom-complex referred to the vision is: blurring or cloudiness of vision, negative ophthalmoscopic findings, absolute paracentral scotomata, normal peripheral field with little or no disturbance of central visual acuity. This combination is indicative of multiple sclerosis, and when associated with exaggerated tendon reflexes, is sufficient to establish this diagnosis. If the scotomata are but relative, hysteria would still be a possibility. If, however, the Babinski toe reflex is present on one or both sides, it can be positively eliminated."

ERNEST THOMSON.

(17) **Risley,** of Philadelphia, reviews the subject of diseases of the eye in cardio-vascular affections, and, in doing so, recounts three cases illustrative of special phases of the connection. SYDNEY STEPHENSON.

VI.—THE SO-CALLED "TRACHOMA BODIES."

(1) **Addario, G.—Preliminary communication. On the occurrence of the Prowazek and Halberstaedter bodies in the normal conjunctiva of man and apes.** *Archives of Ophthalmology*, January, 1911.

(2) **McKee, Hanford.—Trachoma bodies from non-trachomatous eyes.** *Ophthalmic Record*, May, 1911.

(3) **Greeff, R.—The present state of the question as to the trachoma corpuscles.** *Ophthalmology*, October, 1911.

(4) **Albanese.—Researches on epithelial inclusions in the normal conjunctiva and in different forms of conjunctival inflammation. (Recherches des inclusions épithéliales dans la conjonctive normale et dans différentes variétés d'inflammations conjonctivales.)** *Ann. d'Oculistique*, October, 1911.

(5) **Métafune.—Researches on epithelial inclusions in normal and diseased corneæ. (Recherches des inclusions épithéliales dans la cornée normale et pathologique.)** *Ann. d'Oculistique*, October, 1911.

(1) **Addario** has examined scrapings of the normal conjunctiva in men of different ages. He found intracellular bodies with the same characteristics as the trachoma bodies, as evidenced by their semilunar, oval, or triangular form, the brownish-violet to reddish-violet nuclear stain, the granular non-homogeneous appearance, the integrity of the nucleus and its membrane, and the distinct zone which separates them from the nucleus. He also found the usual hood-shaped, oval, triangular, and high-hat-shaped bodies, with distinct nuclear stain, and finely granular contents in the scrapings of the normal conjunctiva of a *Macacus*. The differences between certain forms of intra-epithelial inclusion found in trachoma and other forms of conjunctivitis, and the structures found by him in the normal conjunctiva, he attributes to changes produced by the inflammation. ROSA FORD.

(2) **McKee**, of Montreal, has been able to demonstrate the trachoma bodies in the following non-trachomatous cases:—

1. Catarrhal conjunctivitis (pneumococcal) in an infant of ten days.
2. Two infants less than two weeks old, with normal conjunctivæ.
3. Two adults with normal conjunctivæ.
4. Three infants with acute purulent conjunctivitis.

Three cases of the last group are recorded by him. In each case the smear preparation was negative, but cultures showed staphylococcus albus and the bacillus xerosis. All were well within a week of treatment by 20 per cent. argyrol, and during six months of further observation, showed no signs of developing trachoma. J. JAMESON EVANS.

(3) **Greeff**, of Berlin, is of the opinion that not all the bodies described as trachoma corpuscles, or as chlamydozoa, are of the same nature, nor are they all specific. Trachoma corpuscles have been found in trachoma, in the normal human conjunctiva (Greeff), in the conjunctiva of the monkey (Antonelli, Jr.), in blennorrhœa neonatorum (Stargardt and others), in the urethra of the mother of a blennorrhœic child (Halberstaedter and v. Prowazek), in diphtheritic conjunctivitis (Fleming), in the conjunctivitis of swine plague (Uhlenhuth). It has been shown that gonococci and trachoma corpuscles may occur simultaneously, or alternately, in blennorrhœa neonatorum, and the two have been found simultaneously in adult gonorrhœa. In spite of these facts, Greeff does not believe that trachoma and gonorrhœal conjunctivitis are one and the same disease. He thinks we have to admit that up to the present the significance of the bodies is not known.* A. J. BALLANTYNE.

(4) **Albanese**, working in the laboratory at the Lariboisière Hospital, has examined a series of fifty-one patients with a view to checking the statements of

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* A translation of this important article (read at the Heidelberg Congress, August, 1911) was published in THE OPHTHALMOSCOPE of November 1st, 1911.

the Addarios senior and junior and Spoto that cell inclusions can be found in the normal conjunctiva. The specimens were obtained by scraping with a blunt spatula, spread on a slide, dried, fixed with alcohol, and stained for two hours with diluted Giemsa (5 drops in 10 c.c.). From the results which are tabulated in the article, he concludes that Prowazek-Halberstaedter inclusions occur in a certain number of cases of non-gonococcal ophthalmia neonatorum, but are never present in subacute or follicular conjunctivitis or in the normal conjunctiva. Only those inclusions were regarded as typical which stained blue (the nucleus of the cell being a red-violet) and consisted of a series of small points or double points infinitely smaller than the finest known micro-organisms. These elements are grouped in crescentic or spherical intracellular pockets, and do not appear to have any influence on the cell which contains them. R. J. COULTER.

(5) **Métafune,** working in the laboratory at the Lariboisière Hospital, has examined scrapings from twenty-eight corneæ for cell inclusions. The preparations were taken from eyes with foreign bodies in them or suffering from keratitis or corneal ulceration. The scrapings were made with a Graefe knife, spread on slides, dried, fixed in alcohol, stained in diluted Giemsa (50 drops in 10 c.c. of water) for twenty-four hours, washed, dried, and mounted in cedar oil. The results, which are tabulated, were negative, even in three cases of old trachoma with corneal ulceration. R. J. COULTER.

BOOK NOTICES.

Introduction to the Methods of the Dioptrics of the Human Eye. (Einführung in die Methoden der Dioptrik des Auges der Menschen.)

By A. GULLSTRAND. Leipzig: Verlag von S. Hirzel. 1911, pp. 1-180.

Readers of THE OPHTHALMOSCOPE will have noted the announcement that Professor Gullstrand received the Nobel Prize in connection with his work on this subject, and will be prepared to find in the present volume a book of unusual excellence. In many ways it reminds one of the corresponding portion of Heimholtz's *Handbuch der Physiologischen Optik*. There is the same thoroughness, the same scholarly mixture of the theoretical with the practical, suggesting a great deal in a few words rather than overloading its pages with detail. It shows, in a curious way, how the world has moved on since those days. Helmholtz had to teach physiologists how to adapt the formulæ for thin lenses to cases where the object is in one medium and the image in another. The greater complexity of the "nodal points" was balanced by the simplification of the "reduced eye" of Listing. Now, we have passed beyond the stage of making elementary diagrams of the path of the rays. Familiarity with the camera has taught us that the angular aperture of the pupil and the extent of the field of vision are such that questions of aberration must be taken into account.

Accordingly, in his first chapter Gullstrand passes rapidly on to formulæ of higher approximation, and investigates the case of rays of wide angle. It should be noted that he employs throughout the modern wave-front methods and expresses everything in diopters. His treatment of the theory of the entrance and the exit-pupils is particularly clear and good.

The second chapter is devoted to processes of objective observation. The ophthalmoscope occupies thirty-five pages, a good deal of space being given to the methods of reflexless ophthalmoscopy. This is perhaps the most interesting section from a practical point of view, and yet it is difficult to choose, for the second section, which may be briefly referred to as keratoscopy, and the third on the ophthalmometer, are full of practical information.

Entoptic methods of observation form the subject of the third chapter. Among the points of interest may be mentioned what probably few persons have seen, *viz.*, a method of demonstrating the presence in the eye of false light due to reflection from the internal surfaces of the lens-system.

Chapter IV. deals with methods of measurement as distinct from observation, and Chapter V. describes some special modes of investigating the mechanism of accommodation.

The author gives references to his published papers. It is to be hoped that an English translation of these will some day be published. The present volume appears as part of the *Handbuch der Physiologischen Methodik*, edited by Tigerstedt. GEORGE J. BURCH, F.R.S.

Treatise on Practical Light. By REGINALD CLAY. London: Macmillan and Co. 1911. pp. 519.

This is essentially a laboratory manual. It describes practical methods which in very many cases have been thoroughly tested, and in some evidently designed by the author. It will be found specially useful by those who desire not merely to "press the button" but to perform with their apparatus experiments for which it was not primarily intended. The student will find in it a very clear account of Abbé's theory of microscopic images, and a description of Stoke's method, so seldom referred to, of determining the elements of elliptically polarized light, and a good many other things he has long wanted but has been unable to get from among their mathematical entanglements. GEORGE J. BURCH, F.R.S.

Cysts of the Iris. **(Le Cisti dell' Iride.)** By DR. E. PASSERA. From the *Ophthalmological Clinic of Turin.* Novara Tipografia di G. Gaddi. 1911.

Dr. Passera, who has formerly written on the subject of a cyst of the iris (*Ophthalmologica*, 1909, p. 503), here takes up the whole subject, and seeks to place it in its true position regarding the pathological anatomy of the eye. He shows how cysts of various kinds have been arranged in former papers by various authors, and, whilst not attempting to make a radical change, prefers to arrange them as cysts with liquid contents (serous cysts), and cysts with solid contents.

The various signs and symptoms of cystic growths in connection with the iris are discussed, and the possibility of danger, in cases of cysts allowed to attain too large a size, of glaucomatous manifestations, etc., is referred to. He shows that serous cysts may be multilocular and may very rarely burst spontaneously.

The causes of serous cysts are fully gone into, especially as regards traumatism and in cases of disease. It is proved that perforation of the globe is not necessary to the production of these growths in cases of injury. Retroversion of the iris and hæmorrhage may be causes of such cystic developments.

Spontaneous growths are usually due to some developmental fault and may be epithelial or endothelial in origin. The mechanism of the origin of such growths is fully gone into.

Cysts with solid contents (pearly growths) are then discussed, and also cysts of the posterior layers of the iris; whilst free cystic bodies in the anterior chamber form the subject of the last parts of the paper. A closing note on the treatment of cysts of the iris, advocating excision with iridectomy, completes the long and interesting paper.

Very many references to the literature of the subject are given, not fully but by name, and these show the amount of work done on the subject by the writer. The paper is a mine of information and should be read by anyone specially interested in the subject. LESLIE BUCHANAN.

Coal-miner's Nystagmus. By H. TOMLIN. The *Medical Chronicle*, October, 1911.

Tomlin (Liverpool) publishes an abstract of the Thesis which has won for him the degree of M.D.Vict. We notice with approval the title of the paper; not "miner's" but "coal-miner's" nystagmus. "Miner's" nystagmus is a misleading title, because the disease is peculiar to the collier; it is, as the author points out, confined to the coal-miner. An even better term is one which has been suggested to the reviewer by Mr. J. Jameson Evans — "coal-miner's *neurosis*." This designation is more complete because the actual nystagmus is but a symptom of a definite symptom-complex, a symptom which may be wholly absent The author fails to note that in a certain number of cases there is no nystagmus whatever, nor can it be elicited by rotation or by any other method. The abstract unfortunately does not give an account of the symptoms of the disease, but refers to the original. We are therefore unable to comment upon this part of the work, but would remark that the cardinal symptoms are three: nystagmus, twitching of the lids and neck muscles, and sometimes of other groups of muscles, and hemeralopia. All may be present in a single case, giving the full clinical picture of the neurosis. Any two may be absent. Thus, we may have a case with severe twitching and hemeralopia with dazzling, *but no trace of nystagmus.* Nystagmus is the commonest symptom; hemeralopia is present in at least 60 per cent. of all cases; lid twitching is the least frequent. We can find no reference in the paper to lid twitching and hemeralopia, two very important symptoms, especially from a medico-legal standpoint. The existence of the neurosis without nystagmus has, as far as we know, not yet been noted by any writer upon the subject, but we have seen a sufficient number of cases to be quite certain that there is such a condition. We are in full agreement with the views regarding the causation of the disease. It is a neurosis pure and simple, not induced by spasm of the elevators but by the peculiar nature of the illumination of a coal mine. We fully agree with Pohl that precocious cases are severe; the exception to the rule recorded by the author must be regarded as an exception.

We protest against the position taken up by Tomlin, *viz.*, that a "cured" case may return to work. The following case, which we saw only the other day, is but too typical of what invariably happens.—A mild case seen four years ago was told not to return to work. After a rest of eighteen months, he went back, not to "holing" in the ill-lighted workings, but to wheeling tubs in the electrically lighted "pit bottom." After a few months, nystagmus recurred.

Nystagmus is found in a special type of miner, the nervously liable type, a nervous system easily influenced by the loss of fixation-desire and by other associations of pit life. Such a man will develop nystagmus, and in him the disease will recur with even greater facility than the original attack. The only safe rule is that no patient with nystagmus must ever be allowed to work in a coal mine again, for even when he is apparently cured, the nervous vice can never be eradicated.

We cannot agree with some other points emphasized in the paper. Thus, "The younger the patient, the quicker the recovery." Our experience has been that of Pohl, and is the reverse of that stated.

The influence of the inhalation of marsh gas (fire damp) has perhaps been too lightly put on one side. One of the worst cases we have ever seen had been working in an atmosphere so foul and "gassy" that only electric lights could be used; the safety lamp refused to burn. The inhalation of hydrocarbons may conceivably exert some pernicious influence upon the co-ordinating centres. This question is worthy of further investigation.

The paper is an admirable summary of the subject, although perhaps more from a literary than from a clinical standpoint. The omissions are probably only apparent because the paper is an abstract of a more complete thesis.

We hope the author will continue his researches upon this interesting disease.

T. HARRISON BUTLER.

CORRESPONDENCE.

[While THE OPHTHALMOSCOPE will at all times welcome correspondence from its readers, the Editor does not hold himself responsible for any views expressed in this column.]

HUNTERIAN LECTURE ON COLOUR-VISION AND COLOUR-BLINDNESS.

To the Editor of THE OPHTHALMOSCOPE.

Sir,

Professor Edridge-Green misunderstands me. While fully acknowledging his right, and that of every man, to propound any hypotheses which may commend itself to him, I recognize the equal right of any other man to reject it. And I wrote to indicate the grounds on which it appeared probable that many physiologists would reject this one.

I did not say, and do not now remember, whether Bonnet—a charming writer with the simple directness of Hobbes and the vivacity of Voltaire – specifically referred to colour-vision, but I implied, and maintain, that Thomas Young regarded his own theory of three sets of "nerves" each with a different function, as supporting and illustrating the great generalization of Bonnet. And in the same way Helmholtz, quite unaware of what Young had taught, looked upon his theory as illustrating that of Müller.

Dr. Edridge-Green says that as far as colour-vision is concerned the so-called law is a hypotheses without the least evidence to support it. I beg to differ. On the other hand, the idea, apparently so simple to him, that one nerve-fibre can have several functions, is, to my thinking, in the highest degree improbable. Therein lies the charm of hypotheses. Each is sure to find some champion. But I had no idea of doing battle in the pages of THE OPHTHALMOSCOPE—we should take up too much space. Only, when the challenge is sounded, we are bound to show our banners in reply.

I am, etc.,

GEORGE J. BURCH,
F.R.S.

NORHAM HALL, OXFORD,
February 5th, 1911.

COLONEL HENRY SMITH AND OURSELVES.

To the Editor of THE OPHTHALMOSCOPE.

SIR,—

In the August number of your journal you republish a letter of Dr. Pontius from the *Ophthalmic Record*, and on the strength of that letter you comment on the ethics of my clinic. That letter refers its readers to the April number of the *Ophthalmic Record*, which we must assume you to have read before making your editorial comment. The April number of the *Ophthalmic Record* contained the whole of a controversy between Major Kilkelly and myself, and included the facts published by Dr. Pontius in *North-West Medicine, U.S.A.* I fail to understand your editorial ethics in commenting on the ethics of my clinic on the basis of that letter (a purely personal one) without laying before your readers the whole of the controversy. Those who have read the controversy know that this letter failed to answer the one issue which concerned the matter of the controversy, *i.e.*, the reconciliation of Major Kilkelly's with Dr. Pontius' facts.

To those of your readers who have not followed the controversy I ask you to publish the following *résumé* of the facts. Dr. Pontius' letter I have answered in the *Ophthalmic Record.* It contributes nothing to the original controversy. In February, 1909, while at the Bombay Medical Congress, at the urgent request of Major Kilkelly, I performed twenty-three intracapsular extractions for cataract in his hospital. I left by the next train and never saw or heard of these cases until over a year afterwards, when Major Kilkelly published the results in the *Indian Medical Gazette* and in the *Ophthalmic Record* without consulting me and without asking my permission, even refusing later on to let me have my own notes on the cases. (What about the ethics of these acts!) Dr. Pontius about the same time published his facts of these same cases (again without my permission) in *North-West Medicine, U.S.A.* Major Kilkelly's facts and Dr. Pontius' facts were in so gross want of harmony as regards detail even to the number of cases purported to be mine (one of them had too many cases) that the only conclusion I could come to in that controversy was that these two surgeons had not examined the same cases, and their results were so unintelligible to me that, taken with the first fact, the only conclusion I could come to was that they were not my cases at all. Consequently, from the point of view of science, these cases are of no value, though from the point of view of ethics they may be of interest.

This charge was made by me in the controversy, and it remains unanswered and is unanswerable while their facts stand.

Dr. Pontius in his letter has not even attempted to answer this charge. The rest of his personal attack on me I have answered in the *Ophthalmic Record.*

The following part of the controversy is also of ethical interest.

Major Kilkelly published details of a case of mine (purely private) as a "matter of general interest" to the ophthalmic world because it had gone wrong. It indicated, I take for granted, that "to go wrong" was the usual result of my intracapsular extraction cases, and also that I knew nothing of the after-results of my cases. I had, however, full notes of the case, and was able to publish the other side of the case. But what of the ethics. If A. of the Northern Ophthalmic Hospital published a case of B.'s of the Western Ophthalmic Hospital as a matter of general interest, how would the rest of the ophthalmic surgeons of England treat A.? I think for him it would be a very serious matter. These facts being known to you, I fail to see how you proceed to comment on the ethics of my clinic.

Yours truly,
HENRY SMITH, M.D., M.Ch.,
INDIAN MEDICAL SERVICE.
HON. SURG. TO THE VICEROY.

AMRITSAR,
January 7th, 1912,

[In order to allow readers to judge for themselves whether Colonel Smith has or has not any just cause of complaint, we append the words we employed when introducing Dr. Pontius's letter, which we then believed, and still believe, to be a most important contribution :—

"The obvious sincerity of the following letter by Dr. Nevin D. Pontius, of Seattle, published in the June issue of the *Ophthalmic Record*, prompts its publication in the columns of THE OPHTHALMOSCOPE. It seems to be an important contribution to the ethics of the vexed question of the so-called 'Smith operation.'"—EDITOR.]

SMITH'S CATARACT OPERATION.

To the Editor of THE OPHTHALMOSCOPE.

SIR,—Colonel Elliot's review in the September number of THE OPHTHALMOSCOPE concerns me as well as Dr. Vail, as there are several indictments against me.

First.—That I smoke a cheroot while operating. I plead guilty to this serious charge, but defend myself by asserting that air breathed through a burning cigar is more sterile than air breathed through any mask, and much less in the way from the operator's point of view. For the same reason I allow my visitors to smoke. I have no undergraduates to keep in order, and none of my patients object.

Second.—He says I make mistakes in diagnosis. Again I plead guilty. Who does not? The man who says he does not make mistakes is like the man who shoots a pigeon with every cartridge. He is either no sportsman or a liar.

Third.—He says that Dr. Vail gives me credit for the use of a perchloride douche in ophthalmic operations.

Dr. Vail is merely reporting the practice of my clinic. Colonel Elliot says that the valuable principle underlying the perchloride douche is Herbert's and no one else has a right to claim it, that it is a pity that I did not declare this long ago, nor is it the only variation (he says) in the Jullundur *technique* which appears to have been borrowed unacknowledged from other Indian clinics.

In the first place, I have been using the perchloride douche in ophthalmic and general surgery since the early part of the year 1896. I do not know if Herbert was using it before me or not, I never claimed precedence; as a matter of fact, Colonel Bamber, in a paper read at the Indian Medical Congress, of 1894, advocated the use of this douche, and he had been using it for several years previously, so that, as a matter of precedence, Bamber is easily before Herbert. To claim precedence at this hour of the day for the use of an antiseptic douche in surgery is something similar to a cook claiming precedence for the use of bicarbonate of soda and buttermilk in the making of bread. The underlying principle, however, is not

Herbert's, it is Lister's and Pasteur's, and I have no doubt that a perchloride douche was used in ophthalmic and general surgery when the lot of us were in our long clothes. The rest of Colonel Elliot's statement is unsupported by a single instance. It would be difficult to supply even one, as I have claimed priority for exceedingly little, for though I owe little or nothing to other Indian clinics, yet I have not claimed that others have not used the same methods independently of or before me. A charge of scientific plagiarism of this kind should at least be supported by some facts.

Colonel Elliot is always longing for statistics carefully made out. Early in my career I learnt the futility of attempting to persuade the world by statistics, and hence have adopted a method for which I really think I may claim a little priority; *i.e.*, to train ophthalmic surgeons in possession of clinics in the art of extracting cataracts in the capsule, and not being content until they are practically as accomplished operators as myself (this is not always to my financial interest), knowing well that if I succeeded in persuading India with its 30,000 cataracts a year, the rest of the world would have to follow.

Colonel Elliot says that the younger men who are entering the arena need not fear their reception by the ophthalmic world, and if their case be a strong one they will not need to complain of jealousy or conservatism. It is nice to hear from Colonel Elliot that the millennium is at hand.

I take the opportunity to explain the following point which has been brought to my notice by a friend. Men who are, he says, fair-minded object to the statistics of my earlier papers, because they say that 98 per cent. of first-class results could not possibly have been obtained, as a certain proportion of the cases must have had indifferent fundi or other complication. Quite so. You cannot obtain a first-class visual result, say 6/6, in cases with retinitis pigmentosa, choroidal changes, leucomata, etc., all of which were included in my 98 per cent. of cases. But you can have a first-class surgical result, *i.e.*, with as good a visual result as the conditions present before operation will admit of. All the statistics of the Government Hospitals in Northern India are based on the same plan and I have always taken for granted that the meaning of the term, "first-class result," was self-evident. It is impossible to test for a satisfactory visual result at the end of six, seven or eight days after operation.

Yours truly,

HENRY SMITH, M.D., M.Ch.,
LT.-COLONEL I.M.S. HON. SURGEON
TO THE VICEROY.

To the Editor of THE OPHTHALMOSCOPE.

SIR,—I have only just read the article by Dr. D. W. Greene, of Dayton, Ohio, which appeared in the April number of THE OPHTHALMOSCOPE. The number was received shortly before I left India, and hence the delay in my reading it. In that letter, Dr. Greene makes the following statement:—

"Dr. Reeve (of Toronto) has referred to the twenty-three cases of cataract operated on by Major Smith, at Bombay, in February, 1909, which were reported with comments on the operation by Major Kilkelly. While in Jullundur in November, 1909, Major Elliot, of Madras, first called our attention to the forthcoming publication of these cases, so that we were familiar with them months in advance."

I take the earliest possible opportunity of stating that I did *not* tell Dr. Greene of "the forthcoming publication of these cases." When I was passing through Bombay on my way to Jullundur, Major Kilkelly's *locum-tenens*, Captain Stephen, showed me the notes from which these statistics were compiled, and, if I remember rightly, he also showed me one or two of the cases. I had it definitely on his authority that there was no intention of giving publication to these cases. My first intimation that this intention had been departed from was when I saw Major Kilkelly's article in print. Under the circumstances, I could not have given Dr. Greene the information which he asserts that I did give him. I merely mentioned to him and to Dr. Vail that I had seen these notes.

Later in the same paper, Dr. Greene says:—"Kilkelly's statistics, *except under the conditions named later*, cannot be accepted by any one at all familiar with the average results obtained at Jullundur. *The condition is that contributory negligence, wittingly or unwittingly given* these cases, was responsible for their poor showing." The italics are my own. Major Kilkelly is widely known in India, and such a remark as Dr. Greene has made will only reflect, and rightly so, on the man who could stoop to think such a thing. The fact that it has been published in THE OPHTHALMOSCOPE carries it far wider, and it is right that your readers should learn that no one who knows Major Kilkelly will, for a moment, believe him capable of such mean and despicable conduct as is here attributed to him. Major Kilkelly is an honourable man, a gentleman, and a sportsman. The insinuation against him is a very contemptible one, and should never have been made.

Yours faithfully,
R. H. ELLIOT,
Major I.M.S.

GOVERNMENT OPHTHALMIC HOSPITAL, MADRAS,
January 8th, 1912.

XEROSIS OF THE CONJUNCTIVA AND NIGHT-BLINDNESS.

To the Editor of THE OPHTHALMOSCOPE.

SIR,

In THE OPHTHALMOSCOPE of January, 1912, an article appears by Mr. Sydney Stephenson on the above subject, in which he criticises adversely certain statements made by some observers in regard to such cases; and his paper largely consists in attempts to uphold the oft-repeated assertion that the subjects of this complaint are always in a condition of ill-health.

I maintain that the investigations carried out by him do not support this contention.

I am prepared to agree with the principle that lowered vitality may produce some interference with the physiological processes connected with vision predisposing to a condition of night-blindness, apart from xerosis; this much has been proved already from another class of case. But I do not agree that there is any direct relationship between ill-health and this special type of case found only in children.

The two points on which he specially lays emphasis in support of his view are:—(1) Glands in the neck and other evidences of strumous diathesis, (2) Deficient Hb. per cent. in the blood, or a condition "akin to chlorosis." With regard to the first, such signs are continually met with in nearly all children living under the conditions he so aptly describes, and can almost always be demonstrated. This may fairly be regarded as a coincidence, and not a special feature peculiar to this kind of case; and if there were any direct connection between this strumous diathesis and night-blindness, surely the latter symptom would be much more common than it actually is.

As regards the second point, *viz.*: Deficient Hb. per cent. in the blood. Now

Mr. Stephenson admits that, by his method of examination, 76 per cent. may be regarded as about an average normal standard in young children, and that most of the cases he investigated did not fall below·65 per cent; and therefore he attaches very special importance to a reduction in percentage of about 10 per cent. and calls it a condition "akin to chlorosis".

It is well known that perfectly normal people vary greatly (10-20 per cent.) in their Hb. percentage, a condition entirely compatible with healthy normal metabolism, and the only practical value in any case of a reduction in percentage is the relationship between the oxygen carrying-power of the blood, on the one hand, and the need of the tissues for this gas, on the other. Nature has fortunately allowed a very wide margin in both these directions, which admits of considerable variations in the Hb. per cent. (*e.g.*, often as low as 30 or 40 per cent) in the blood and the oxygen per cent. in the air (*e.g.*, often as low as $\frac{1}{2}$ or even $\frac{1}{3}$ of an atmosphere); and the demand of the tissues is sufficiently elastic to permit a very decided reduction in both without the normal metabolism being seriously interfered with. Moreover, long before such interference in the metabolic processes in the body takes place, other signs are very evident which indicate that the tissues are not receiving the supply of oxygen which they demand, and the symptoms are always the same in which ever way this deficiency is brought about. They are :—(1) Severe dyspnœa out of all proportion to the amount of muscular effort performed. (2) Aching of the muscles which at the moment are doing the most work. (3) Embarrassment of the heart and circulatory system.

Has Mr. Sydney Stephenson elicited these symptoms in his patients? Unless he has there is no justification whatever for saying that the diminution of 10 per cent. of Hb. in the blood has the exaggerated significance which he attaches to it; nor that it is a defect in any way incompatible with a normal state of health.

There is only one other point to which I wish to allude, and that is the change in the field of vision for colours, especially red and green. My experience is that the accurate taking of a field requires a considerable amount of intelligence on the part of the patient; and even with the best of them a record may easily be made to vary in some details within a few hours of making a chart. Fields of vision can only be judged on general principles, and it is in this sense that I have stated elsewhere that "the fields of vision are invariably full."

If Mr. Stephenson feels that his young subjects justify him in placing on record the minute observations which he describes as a symptom definitely associated with these cases, we must accept it; but personally I should hesitate to regard it as a sign of any great value.

I am, Sir,
Your obedient servant,
MALCOLM L. HEPBURN.

111, HARLEY STREET, W.

NOTES AND ECHOES.

Deaths.

WITH regret we announce the death of Karl Horstmann at the age of 65 years, which occurred from malignant disease of the intestine on January 16th last. Horstmann was extraordinary professor of ophthalmology in the University of Berlin. His contributions to the literature of ophthalmology were both numerous and important.

The death is announced of Hugh B. Williams, at the age of 52 years. Dr. Williams, for many years a member of the staff of the Illinois Charitable Eye and Ear Infirmary, practised his profession in Chicago.

* * * *

Julius v. Michel.

A MEMORIAL service for Julius v. Michel, the late professor of ophthalmology at Berlin, was held on January 27th by the Berlin Ophthalmological Society. The address was given by Professor J. Hirschberg. The ceremony was well attended, and amongst those present were the Rector of the University of Berlin and Professors Orth, Waldeyer, and Bumm.

* * * *

Appointments.

PROFESSOR J. LORRAINE SMITH has been appointed honorary pathologist, with a seat on the Medical Board, of the Manchester Royal Eye Hospital.

Professor Salzmann, of Vienna, has been appointed professor of ophthalmology in the University of Graz.

It is reported that Dr. Emil Krückmann, of Königsberg, has accepted a call to Berlin in place of the late v. Michel, a chair declined in turn by Uhthoff, of Breslau, Hess, of Würzburg, and Axenfeld, of Freiburg i. Br.

Dr. Wilhelm Meisner has been recognised as *privatdozent* of ophthalmology in Königsberg, Prussia.

Drs. Liégard, Grelault, Lataillade, and Perrossier have been nominated *chefs de clinique* of the Paris Quinze-Vingts.

F. R. B. Skrimshire has been appointed ophthalmic house-surgeon to St. Thomas's Hospital, London.

* * * *

Dr. F. Antill Pockley.

A DINNER was recently tendered to Dr. F. Antill Pockley, ophthalmic surgeon to Prince Alfred Hospital, Sydney, and lecturer on ophthalmology in Sydney University, by a number of medical colleagues, in order to show their appreciation of the way in which Dr. Pockley presided over the Ninth Australasian Medical Congress. The chair was occupied by Sir Philip Sydney Jones (himself a medical man), who presented the guest of the evening with a silver centre-piece and candelabra.

* * * *

The American Academy of Ophthalmology.

THE Seventeenth Annual Meeting of the American Academy of Ophthalmology and Oto-Laryngology will be held at Niagara Falls, Ontario, on August 20th, 21st, and 22nd, 1912. Dr. A. Elschnig, of Prague, will be the guest of the Academy, and will deliver the address.

* * * *

The Oxford Ophthalmological Congress.

THE Congress will assemble at Keble College, Oxford, on Wednesday, July 17th next, and the meeting will be held on Thursday and Friday, July 18th and 19th. Addresses will be given by Dr. Casey A. Wood (Chicago), Professor Straub (Amsterdam), Dr. Thomson Henderson (Nottingham), and Dr. S. E. Whitnall (Oxford). Any Member who has cases or specimens to show or is desirous of giving a demonstration or exhibition is requested to communicate with the Honorary Secretary at 33, Welbeck Street, London, W. It is anticipated that an "opaque projector" will be available for purposes of demonstration.

* * * *

THE

OPHTHALMOSCOPE.

A MONTHLY REVIEW OF CURRENT OPHTHALMOLOGY.

VOL. X.—No. 4.] APRIL 1, 1912. [TWO SHILLINGS.

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ORIGINAL COMMUNICATIONS.

A CASE OF BILATERAL CONGENITAL ANTERIOR STAPHYLOMA OF THE EYEBALL, WITH HISTOLOGICAL EXAMINATION.

BY
SYDNEY STEPHENSON,
LONDON, ENGLAND.

Clinical Facts.

THOMAS H——, born March 23rd, 1909, was admitted to the Queen's Hospital for Children, London, on March 31st, 1909, under the care of the late Dr. George Carpenter, who was good enough to transfer the baby to my ward.

History.—The child was born with the eyes as they now are.

He is the first and only child. He was born after a non-instrumental labour, the first stage of which lasted little longer than twenty-four hours. The membranes ruptured twenty minutes before the head was born.

When the mother was three months pregnant, some boiling bacon fat splashed into her eyes. In consequence of the accident, she was unable to open her eyes for four or five days, and attended St. Bartholomew's Hospital as an out-patient for about three weeks. No history was obtained of any maternal discharges.

State on admission.—A small baby, weighing 4¼ lbs.

Each palpebral fissure is occupied by a globular, fleshy mass, in which no trace of cornea can be recognised (*see* figure 1). The mass, which is translucent when light is thrown upon it by a lens, protrudes from between the eyelids, and is larger on the left than on the right side, where it has about the dimensions of a small marble. It shows no sign of pigmentation. The red and fleshy masses move in consonance with the globes, which can be seen and felt to be present in the orbits. The eyelids cannot be closed so as to cover the fleshy prominences, which are accordingly always exposed to view, whether the baby is asleep or awake. This probably accounts for the fact that the surface of the staphyloma shows a faint whitish hue—is keratinised, in fact. The

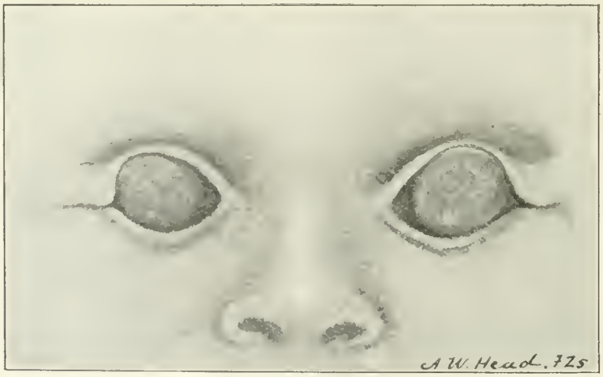


FIG. 1.

conjunctival sacs are well-formed. Each palpebral fissure is extended by a slit-like prolongation beyond what should be the outer canthus, thereby recalling the congenital anomaly familiar as macrostoma or congenital enlargement of the mouth.

There are no evidences of recent inflammation as regards the palpebral conjunctiva, which is smooth, thin, and barely reddened. In particular, there is nothing in the condition of the conjunctiva to suggest an antecedent ophthalmia. No discharge is present from the conjunctiva.

Other congenital deformities are present, as follows.—1. The head is spherical, measuring $11\frac{1}{4}$ inches in circumference (*microcephalus*). 2. The ears are normal as regards shape, but from the posterior surface and the helix there grows forward a fringe of long, soft, dark hair. 3. The right testicle cannot be felt in the scrotum, although the left one is in place (*monorchism*). 4. The little finger is small and incurved—it is, in fact, of Mongolian type. 5. The lower extremities show several deformities: (*a*) no movement at the hip-joint can be elicited; (*b*) the patellæ appear to be absent; and (*c*) the knees cannot be flexed, but extension is possible to the extent of a right angle on both sides (*genu recurvatum*).

Progress and Result.—Whilst in hospital, the baby was subject to attacks of dyspnœa, each lasting, as a rule, for a few minutes only. But he died in one of these attacks on May 29th, aged sixty-seven days, after a stay in hospital of fifty-nine days.

Successive weights were:—$4\frac{1}{4}$ lbs., $4\frac{1}{2}$ lbs., $4\frac{3}{4}$ lbs., 5 lbs., 4 lbs., $3\frac{7}{8}$ lbs., (May 26th, 1909).

Histological Examination.

Permission for a *post-mortem* examination was refused by the child's parents. But the eyeballs, removed within twenty-four hours of death, were found to be elongated with a definite anterior protrusion, such as had been noted during life. The shape of each eyeball, to the hinder end of which was attached a stump of the optic nerve, was most peculiar. The outline was roughly that of a cottage loaf. The smaller, anterior, end was translucent, but the larger, posterior, segment did not allow daylight, even when concentrated by a lens, to traverse its walls. The appearance of the eyeballs may be better gathered from an examinution of figure 2 than from any mere verbal description. The right globe measured 23 mm. by 14 mm. The left globe measured 22 mm. by 10 mm. The anterior protrusion measured 8·5 mm. in the case of the right, and 8 mm. in the case of the left eye.

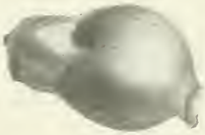


FIG. 2.

The eyeballs were placed in 10 per cent. formol made with 0·75 sodium chloride solution.

The left eyeball was frozen and bisected meridionally. On section, the posterior larger portion was seen to be lined with choroid and pigmented, while the smaller anterior cavity, forming the protrusion noted during the life of the patient, was translucent and non-pigmented. The two internal cavities of the specimen were connected by means of a narrow isthmus.

The specimens were embedded in celloidin, cut, and stained in several ways. The histological appearances were as under:

The **cornea** was represented by a thick, domed sheet of imperfectly differentiated tissue, free from evidences of inflammation (figure 3). It consisted of epithelium, fibro-cellular tissue, and blood-vessels. The superficial epithelium was more or less cornified, and particles of keratohyalin could be seen in some of the cells. The epithelium extended deeply into the underlying tissues in the form of epithelial processes, recalling those characteristic of a papilloma. Fully one-half of the pseudo-cornea was formed by the epithelium, together with its processes. The remainder of the cornea was made up of laminated white connective tissue, including deeply-stained oval or round nuclei. It was permeated by a meshwork of elastic fibres, well brought out in specimens stained by Weigert's fuchsin-resorcin method. It also contained a large number of well-formed blood-vessels, thus accounting for the red colour it presented during life. Nothing could be seen of Bowman's membrane. In particular, it is to be noted that not a trace could be recognised either of posterior endothelium or of Descemet's membrane.

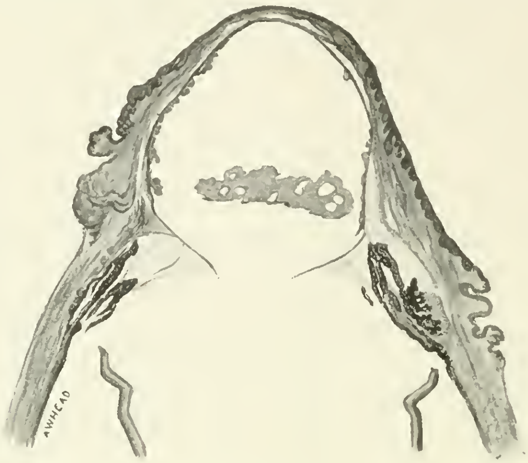


FIG. 3.

There was no **anterior chamber** in the proper sense of the word. The anterior cavity seen on section of the eyeball was found with the microscope to be filled with the distended, globular-looking **capsule of the lens**, lined with a more or less continuous layer of cubical epithelium. The capsule was missing from the posterior pole, although present in such sections as happened to pass above or below the pupillary area. Clinging to the cubical epithelium, and doubtless derived from it, were isolated clumps of large, clear, nucleated cells. In addition to these, the cavity enclosed by the lens capsule contained here and there masses of similar cells, intermingled with which were smaller cells which possessed the same general characteristics. The cavity further included amorphous *detritus*.

A few words of description regarding the arrangement of the parts posterior to the cornea.—To begin with, the capsule of the lens lay in contact with the hinder surface of the cornea. At first glance the **iris** appeared to be wholly absent, but more careful examination revealed the fact that its rudiment, as shown by figure 3, was present on one side in certain of the specimens. It lay between the outer aspect of the attenuated ciliary processes, on the one hand, and the inner aspect of the ciliary body, on the other. It took the form of a short stump of tissue, composed of pigment cells covered with a delicate, vascular fibro-cellular layer, containing, especially towards the surface, a certain number of small cells loaded with particles of brown pigment. For all practical purposes, however, the condition was one of aniridia. The observation is of importance as bearing upon the ætiology of the condition, inasmuch as no process of fœtal inflammation would be competent to account for absence of the iris.

Scanty remains of the **capsulo-pupillary membrane** could be recognised in some of the sections. The **ciliary bodies** was represented by a triangular mass of non-striped muscular fibres. The well-developed **ciliary processes,** consisting of connective tissue, blood vessels, and pars ciliaris retinæ, were elongated in an antero-posterior direction, evidently as the result of traction. Fibres of the **suspensory ligament** could be seen lying on the orbiculus ciliaris and attached to the capsule of the lens.

The **vitreous humour** showed no abnormalities, and, in particular, no fibrous formation. The hyaloid artery could not be seen. The hyaloid membrane was present.

Sclera and **choroid** were well developed.

The layers of the **retina**, with the exception of that of the rods and cones, could be readily recognised in the sections.

The **optic disc** presented no peculiarities.

The right eyeball presented changes very similar to those described above.

Finally, one point may be again insisted on, namely, that histological evidences of inflammation were wholly lacking, a point confirmed by my friend, Mr. Stephen Mayou, who was good enough to examine the microscopical specimens.

Remarks.

The appearance of the eyes during life was believed to be more suggestive of mal-development than of inflammation, an opinion expressed by me when I brought the patient under the notice of the members of the Ophthalmological Society.* The associated condition of the palpebral fissure (*see* figure 1), the microcephalus, the monorchism, the genu recurvatum, and, lastly, the absence of the patellæ appeared to point strongly to the same conclusion.

This view, formed on clinical grounds, was fully substantiated by the results of microscopical examination. The eyeballs showed not a trace of antecedent inflammation. Neither could the changes present be explained on that view. On the other hand, the eyeballs manifested many evidences of retarded development, especially in the absence of the anterior chamber, of the iris, of Descemet's membrane, and of the endothelium of the cornea. The hole in the posterior capsule of the crystalline lens, moreover, told in the same direction.

The developmental failure in this case has evidently fallen upon the mesoblast, which at an early period of fœtal life passes in between the surface epiblast and the rudiment of the crystalline lens, and from which are eventually developed the substantia propria of the cornea, Descemet's membrane, the endothelium of the cornea, the ligamentum pectinatum, the pupillary membrane, and the stroma of the iris. No excretory channels are present in such a case. Assuming, as we must do, a rise in intraocular tension during fœtal life, we have an explanation of the staphylomatous pseudo-cornea, moulded, as it were, on the underlying lens without the interposition of an anterior chamber, of the stretched ciliary processes, and of several other points shown by the specimens.

---

* Patient, then aged 44 days, was shown at a meeting of the Ophthalmological Society of the United Kingdom on May 6th, 1909 (see *Transactions,* Vol. XXIX, p. 220).

A case by Stephen Mayou (*Trans. Ophthal. Society U.K.*, Vol. XXX, 1910, p. 120) is to the point. The cornea, although distended, remained clear, and so the author described the condition not as an example of "congenital anterior staphyloma" but of "congenital anterior synechiæ with buphthalmos." There was no anterior chamber, and Descemet's membrane was partially absent. The canal of Schlemm was missing, and the ligamentum pectinatum and the angle of the chamber were imperfectly formed. A large gap in the posterior capsule of the lens was filled in with vitreous of atypical development. The suspensory ligament was absent. A persistent hyaloid artery, with nucleated sheath, was present. The whole condition was explained by Mayou on the basis of a purely developmental defect.

Again, in a case of congenital anterior staphyloma described by E. Treacher Collins (*Trans. Ophthal. Society U.K.*, Vol. XXIX, 1909, p. 169), Bowman's membrane, Descemet's membrane, the endothelium of the cornea, the ligamentum pectinatum, and the stroma of the iris, were absent, and, as Collins pointed out, such conditions could never result from ulceration of the cornea. The cornea was composed of the superficial epithelium, together with laminated fibrous tissue, cells, and blood-vessels.

Although, then, this is without doubt the pathogeny of the case recorded in the present communication, it by no means excludes the possibility of a congenital anterior staphyloma resulting from fœtal inflammation, as so stoutly maintained by J. Herbert Parsons (*Trans. Ophthal. Society U.K.*, Vol. XXIV, 1904, p. 47), and George Coats (*Trans. Ophthal. Society U.K.*, Vol. XXVI, 1906, p. 36, and THE OPHTHALMOSCOPE, 1910, p. 248). It merely goes to show that the rare condition in question may arise either from developmental or inflammatory causes. The one view, in my judgment, does not exclude the other.

FOUR GENERATIONS OF BLUE SCLEROTICS.

BY

CHAS. A. ADAIR-DIGHTON, M.B., F.R.C.S.Edin.,

HON. ASSISTANT SURGEON EYE AND EAR INFIRMARY, MYRTLE STREET, LIVERPOOL.
HON. OPHTHALMIC AND AURAL SURGEON, TOXTETH INFIRMARY, LIVERPOOL.
HON. OPHTHALMIC AND AURAL SURGEON, BIRKENHEAD AND WIRRAL SICK CHILDREN'S HOSPITAL.

THE family, of which I present merely a brief case-outline, is of interest because in almost all of the patients there is a history of frequent fractures. The shortness of my reports is due to the fact that the patients realised, or over realised, the value of their histories, and rendered further investigations impossible for any but a millionaire. Otherwise, I was hoping to obtain the co-operation of an expert radiographer and write a complete paper from both the ophthalmic and orthopœdic side of the question, and thus possibly offer conclusive proof of the dependence of blue sclerotics and osteoporosis on one another or upon some factor common to both.

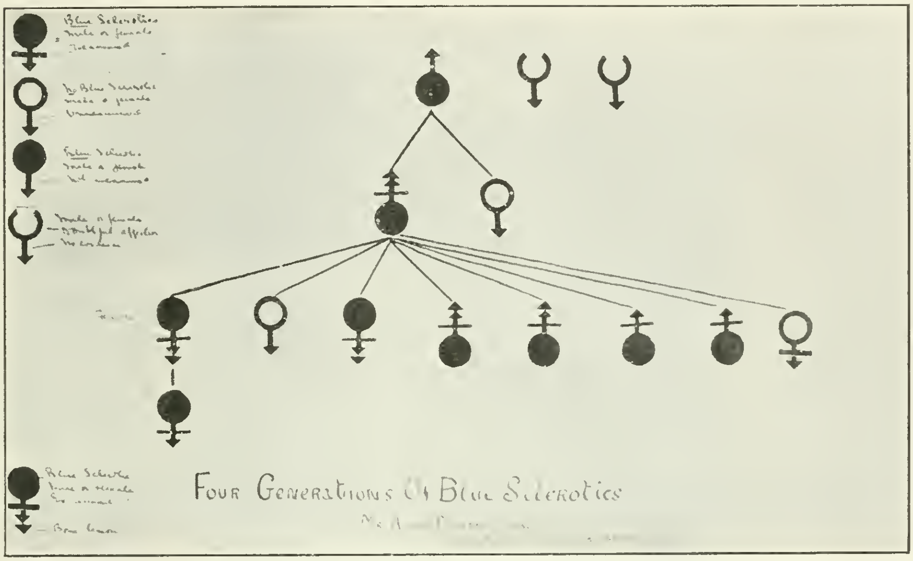
The family, I may add, are of Welsh extraction, so that I am only one more of the medical world who owes something to Wales.

The histories I obtained, before the Welsh blood in the patients asserted itself, are as follows :—

Patient, aged 49 years, head of present generation, marked azure blue sclerotics, gerontoxon. Slight hypermetropia both eyes. Has had fracture of both legs as a child, and in recent years fractured olecranon of right arm whilst swimming.

Patient had one sister who did not have blue sclerotics. His father had them but his father's two sisters had no sign of them. Patient married; his wife, a woman aged 42, has not blue sclerotics. From this marriage there are eight children, seven of whom are still alive.

Mrs. M., aged 23, blue sclerotics, no embryontoxon, hypermetropia both eyes. Has had fractures of both legs from trifling causes. Also has nerve deafness which started three months after birth of child, the only member of the fourth generation. This child, now aged one year and nine months, has blue sclerotics, but no embryontoxon.



Four Generations Of Blue Sclerotics

Bessie P., aged 22, pale azure blue sclerotics, no embryontoxon, hypermetropia both eyes. Has broken right leg.

William P., aged 19, pale azure blue sclerotics, no embryontoxon, hypermetropia. Has fractured one arm above wrist (Colles) and the other above elbow.

M.P., aged 18, no blue sclerotics. Has had no fractures.

Robert P., aged 14, pale azure blue sclerotics, no embryontoxon, hypermetropia. Has been operated on for genu valgus, and, in addition, has broken right collar bone once, right arm twice, and left arm once.

John P., aged 13, pale azure blue sclerotics, hypermetropia. No fractures.

Albert P., aged 8, pale azure blue sclerotics, hypermetropia. No fractures.

In addition to above, one child, a female, died at an early age of meningitis. She had not blue sclerotics.

BLOOD PIGMENT STAINING OF THE CORNEA.

BY

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SURGEON TO THE GLASGOW EYE INFIRMARY.

THIS condition, in which, owing to recurrent hæmorrhage into the anterior chamber, blood pigment is deposited in the corneal substance, is somewhat infrequent.

Since Baumgarten first described the condition in 1883, and Lawford, a few years later, conducted his careful investigations upon the histological findings, only about twenty-five or thirty cases have been recorded.

The importance of the condition is two-fold From the clinical point of view, it is necessary to distinguish the appearances to which this form of pigmentation gives rise from those arising from dislocation of an amber-coloured lens into the anterior chamber. From the point of view of prognosis, it may be said that when the cornea presents this change in a marked degree, there is probably a very serious alteration in the interior of the eye.

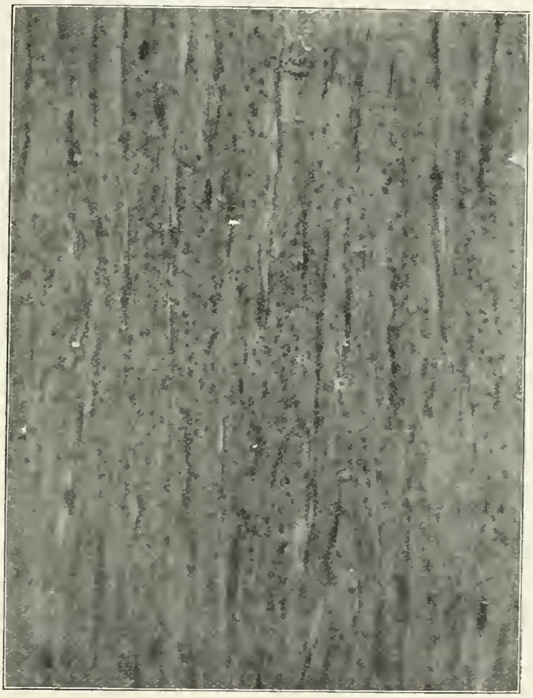
Five cases have come under the writer's immediate notice, two being seen only in the pathological laboratory, the others having been watched clinically as well as examined histologically.

In all five cases there had been serious injury to the eye ; such were a blow from a stone, a kick from a boot, a blow from a heavy stick, a puncture from a fork, and a blow from a hard rubber ball. In each case extensive recurrent hæmorrhage into the anterior chamber had taken place, and owing to a long-continued irritation of the eye, it was deemed advisable to remove the latter. The condition of the interior of the globe, found on examination, varied somewhat, but in all it was clear that the correct treatment had been carried out, as it was hopeless to expect any good result to follow after such serious damage. Separation of the retina was found in three cases. Chronic cyclitis was present in the two others.

John Griffith considered that increased tension was a necessary factor in the ætiology of the production of blood staining, but in three of the cases no such elevation of tension was present when the staining was first noted, whilst in the two remaining cases it was not remarked, owing, doubtless, to the fact that there was perforation of the globe. It is reasonable, however, to expect that when the globe is not opened and an extensive hæmorrhage occurs into it, the tension of the eyeball will be elevated at some time or other, unless there has previously been a condition of much lowered tension.

It may be accepted that the sequence of events is somewhat as follows.— A quantity of blood having been liberated in the anterior chamber, clotting takes place and partial organisation of the clot follows. The red corpuscles give up their hæmoglobin, which is dissolved in the aqueous humour and carried through the spaces of Fontana into the cornea. In the central area of the cornea the currents are slower than elsewhere, and in some manner the hæmoglobin becomes altered and a body is formed which is much less soluble and therefore becomes deposited. This body may not be, and probably is not, always the same in chemical constitution. Thus, E. T. Collins has shown that sometimes iron is not present but that it is in a few cases. The chemical reactions are difficult to ascertain with exactitude, and spectroscopic examination does not give quite definite results, so that the precise nature of the substance which is deposited in the cornea is not clearly known, although in most instances it is probably hæmatoidin.

The present case is that of A.G., *æt.* 33 years, who was struck on the left eye by an india-rubber ball on the 28th of July, 1911. The eye had not been "good" for ten months or a year before, and there was a doubtful history of an injury (no details available). When first seen on the 31st July, 1911, at the Eye Infirmary, Charlotte Street, Glasgow, the eye was irritable, the anterior chamber was full of blood and there was considerable pain. T.n. Ciliary tenderness. The eye continued in the same state until the 17th August, when it was noticed for the first time that the central area of the cornea was greenish in colour. The greenish colour became more marked on subsequent days and apparently reached a maximum of intensity and size about the 14th September. The eye was very weak and lacrymation was profuse. On the 2nd October the tension was noted for the first time as + 1, and the blood in the anterior chamber was increased in quantity. At this date the patient was admitted as an in-patient and confined to bed. The amount of blood in the anterior chamber became less until on the 16th of October it occupied only about one-third of the anterior chamber. The area of coloration at this time was more greenish-amber, and there was a ring of clear cornea, through which the iris and the blood behind the cornea could be seen.



As the eye continued to be painful and tender, and the visual acuity was *nil*, it was decided to excise the eye on the 10th of November, 1911, which was accordingly done.

The globe was fixed in 5 per cent. formalin, and was opened by a vertical antero-posterior section.

It was found that the retina was separated, and that there was blood-stained fluid behind it. The amount of blood in the anterior chamber was small, only a layer of clot, adherent to the cornea at the lower part, being visible.

The area of pigment deposit in the cornea was very clearly seen with its sharply defined edges.

Sections of the cornea showed that the pigmented area contained immense numbers of very small, highly refracting bodies, some elongated and some seemingly circular. It was seen that the granules varied widely in size, some being six or eight times larger than others. The granules stained poorly with any stain, but best with eosin. The largest granules were found in the anterior layers, the smallest in the central layers of the cornea. The elongated bodies were found scattered amongst the others, but in greater numbers in the anterior than in any other part of the cornea. Close examination showed that a few granules might be found in front of Bowman's layer, and also that the pectinate ligament and the meshwork at the angle of the anterior chamber held a number of somewhat similar bodies. The posterior three or four lamellæ of the cornea were absolutely free from the granules.

It is interesting to note that the spaces between the corneal lamellæ in and close to the area of cornea involved in the deposit contained a coagulated material, which had a somewhat gelatinous appearance, and which has not been described formerly.

The state of the iris is worthy of note in this case, there being a very distinct layer of newly-formed fibrous tissue upon its anterior surface, passing completely across the pupillary area.

In connection with this subject it is of interest to note that Fleischer published a paper in the *Münchener med. Wochenschrift*, 1909, S. 1120, which deals with the "peripheral brownish-green corneal colouration." This peripheral colouration is found in certain general diseases, particularly cirrhosis of the liver, pancreatic disease, and certain forms of insular sclerosis of the brain and cord. Fleischer was of opinion that this pigmentation was hæmatochromic in origin. Histological examination showed that the deposit was in the conjunctiva and in the membrane of Bowman rather than in the corneal stroma. It is thus to be compared with the pigmentation of the skin in Addison's disease, rather than with that which is the subject of these notes.

BIBLIOGRAPHY.

Baumgarten.—*Arch. für Ophthalm.*, Bd. XXIX, Heft 3, 1883.
Lawford.—*Trans. Ophthal. Soc. U.K.*, Vol. VIII, p. 60, 1888.
Vossius.—*Arch. f. Ophthalm.*, Bd. XXXV, Heft 2, 1889.
Leber.—*Arch. f. Ophthalm.*, Bd. XXXV, Heft 2, 1889.
Collins, Treacher.—*Trans. Ophth. Soc. U.K.*, Vol. XI, pp. 43 and 45, 1891.
Collins, Treacher.—*Trans. Ophth. Soc. U.K.*, Vol. XV, p. 69, 1896.
Griffith, John.—*Trans Ophth. Soc. U.K.*, Vol. XIV, p. 74, 1894.
Griffith, John.—*Trans. Ophth. Soc. U.K.*, Vol. XV, p. 86, 1895.
Clarke, Ernest.—*Trans. Ophth. Soc. U.K.*, Vol. XXIII, p. 322, 1903.
Weeks.—New York Eye and Ear Infirmary Reports, 1893.
Hirschberg.—*Centralbl. f. prak. Augenheilk.*, Bd. XX., p. 177, 1896.
von Hippel, E.—*Archiv. f. Ophth.*, Bd. XLIV, Heft 3, 1897.
Romer.—Vossius' *Sammlung*, Bd. II. S. 8, 1899.
Praun.—*Die Verletzungen des Auges*, 1899.
Scheffels.—*Zeitsch. f. Augenheilk.*, Bd., V, 1901.
von Richter.—*Ophth. Klinik*, Bd. XVI, 1904.
Troncoso, Uribe.—*Anal. de Oftal.*, 1904.
von Barlay.—*Zeitsch. f. Augenheilk.*, Bd. XVIII, 1907.
Fleischer.—*Münch. med. Wochensch.*, 1909.
Jakub.—*Westn. Ophthal.* (from *Jahresbericht der Ophth.*), 1910.

COMPLETE CONGENITAL DISLOCATION OF THE LENS: A FAMILY HISTORY.

BY

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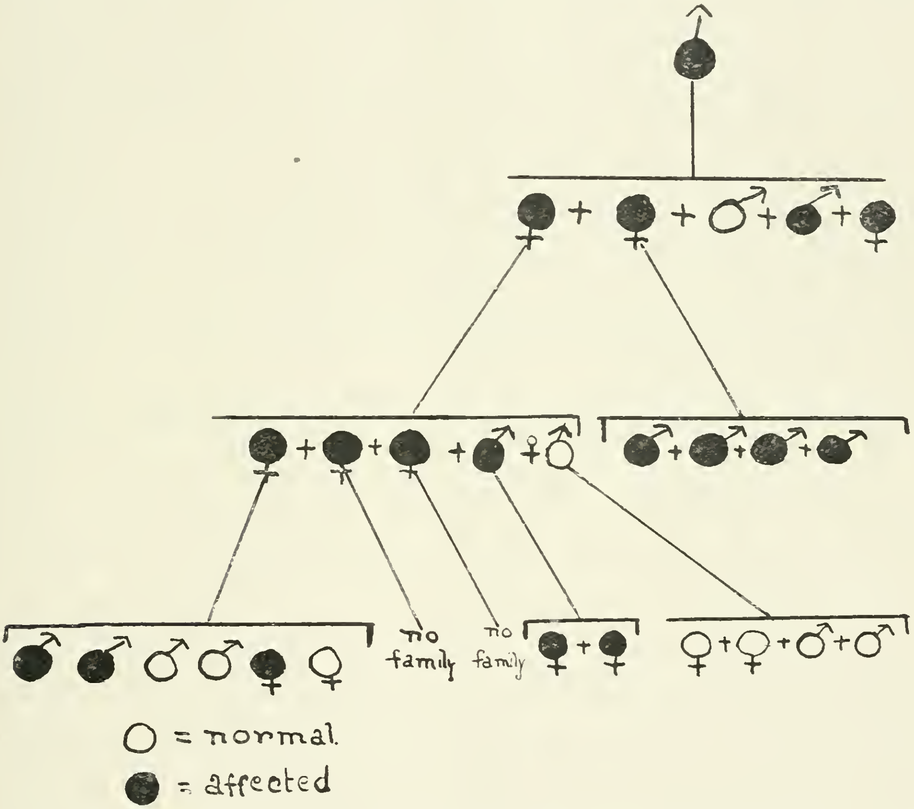

SO far as can be judged, short of actual dissection, nothing abnormal exists in the subjects of the present communication beyond the lenticular dislocation itself. The condition is bilateral; there is no coloboma of the uveal tract; and the crystalline lens, in the individuals in whom it can be seen, appears well developed and free from opacity. Six affected individuals have been examined—three adults and three children. In the children the lens in each instance could be seen floating free in the vitreous humour. In one it temporarily migrated into the anterior chamber of one eye and gave rise to such irritation—iritis, etc.—that it had to be extracted. In the adults a satisfactory view of the interior of the eye with the ophthalmoscope could not be obtained. The pupils were small and non-dilatable, and the iris matted and firmly fixed by adhesions, probably the result of old iritis or irido-cyclitis set up by the movements of the lens. One individual had an eye enucleated, her history indicating shrinkage of the globe and recurrent attacks of pain, doubtless excited in a similar manner. Further, the sight of all the adults examined was markedly improved by + 10 D. spheres, and characterised by complete loss of accommodation. As regards the other abnormal members of the pedigree, the histories volunteered clearly pointed to a similar condition, and we are justified, I think, in assuming that in all there was congenital aphakia due to dislocation of the lens, not improbably as a result of absence or imperfect development of the suspensory ligament.

Examination of the pedigree shows at once that the condition is certainly not a Mendelian recessive; also that it affects both sexes in equal numbers. In two families, with four and two children respectively, it seems to behave as a pure dominant; in all the others there are both affected and unaffected individuals, the former preponderating. The only unaffected individual who has a family, it is interesting to note, has all his children (four) unaffected. We may assume, then, that the normal condition is recessive to the abnormal, and that, therefore, the latter probably differ from the others, not in lacking something essential to complete development, but rather in possessing some additional character or factor in virtue of which the normal development of the suspensory ligament is interfered with. On this assumption, and owing to the fact that the majority of the families contain both affected and unaffected individuals, we must regard the affected individuals as heterozygous [Ii] for this inhibitory factor. Assuming, further, that each marriage has been between such a heterozygote and a homozygous normal [Ii × ii], which we are justified in doing in the absence of any history of cousin or other inter-relation marriages, we should expect as a result an equal number of affected and of unaffected offspring [Ii + Ii + ii + ii]. The actual results, however, show a large preponderance of affected individuals. Tabulating the offspring of the union of an affected with a non-affected parent, we find as follows:

Affected.	*Non-affected.*
4	1
4	1
4	0
3	3
2	0
17	5

The total of the five such families is twenty-two, *viz.*, seventeen affected and five non-affected individuals, a result suspiciously like the 3 : 1 simple Mendelian ratio. Further, on examination of the individual families, it is curious to find two containing (1) members which apparently throw off only affected individuals when married to a normal recessive; (2) members which throw off both recessives and dominants, in one instance, in equal numbers; and (3) one member at least breeding true to the recessive character. Such a result, however, is not in this instance found in association with the union of two heterozygotes and at present we must regard its significance as unknown.

We are justified, however, in tentatively concluding that (1) normal is recessive to abnormal, and (2) the individuals exhibiting the latter condition are heteroxygous in composition for a certain factor in presence of which the usual development of the suspensory ligament of the lens is inhibited.

But what is this inhibitory agent? Two hypotheses suggest themselves:—(1) the suspensory ligament may become ruptured after its formation, a suggestion the advanced development of the lens lends some colour to, although, on the other hand, the exact nature and mechanism of the ætiological factor on this assumption is difficult to conceive; or (2) it may be prevented from forming at all. In an early stage of development the lens vesicle practically fills the optic cup, which afterwards in virtue of its more rapid increase in size grows away from it. But it is during this stage of contact that the cellular adhesions between the equator of the lens vesicle and the ciliary body, described by Treacher Collins as the mode of formation of the suspensory ligament, occur, and anything which would interfere with intimate contact until the increase in size of the optic cup became pronounced would, of course, render difficult the formation of a functional suspensory ligament. Such a condition would seem to be fulfilled by an undue persistence of that portion of the intruding mesoblast known as the posterior fibro-vascular sheath, although the complete development of the iris and the clinical absence of any remnants indicate that such a persistence could not have been unduly prolonged.

I have to thank Mr. H. P. Bennett, of Newcastle-upon-Tyne, in whose out-patient practice the cases were investigated, for permission to publish these results.

NOTES FROM AN INDIAN EYE CLINIC.

The Government Ophthalmic Hospital, Madras : Some Impressions.

BY

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QUEENSLAND.

THE writer has recently had the pleasure of spending three months at a notable ophthalmic centre in India, and takes this opportunity of acknowledging the kindness of Surgeon-General Bannerman, in giving him permission to work at the Government Ophthalmic Hospital, Madras. To Lieut.-Col. Elliot, I.M.S., under whose valued tutelage he had the privilege of working, he is under a deep sense of personal obligation Col. Elliot spared no pains to make his visit both interesting and valuable. His ripe experience, and his wealth of material, clinical and statistical, were placed unreservedly at one's disposal.

Some account of ophthalmic work in India, as seen at Madras, may not be without interest to those engaged in eye work elsewhere. The incidence of disease in Oriental countries is often very different from that met with under analogous conditions in a European community. Methods of treatment, too, have often to be varied to meet local requirements.

The hospital is built on the pavilion principle, the various sections being connected by paved and covered gangways. There are one hundred and forty-four beds, but accommodation for thirty-four more patients will shortly be provided. It consists of seventeen wards, six being large ones of fourteen or fifteen beds each ; the rest, smaller. The floors are paved with large flags of white marble, and the walls are glass-tiled to a height of eight feet. Each section has a bathroom, with marble floor and overhead shower, and a marble latrine with water flushing arrangements. The water supply is obtained from two overhead 5,000 gallon tanks, which are filled in one hour by an electric rotary pump. An electric lift in the main building conveys patients and staff from one floor to another. Telephones will shortly make connection between the different parts of the hospital.

The present condition of the place is the outcome of seven years' effort on the part of the present incumbent. Prior to that time, it consisted of three old blocks, with porous floors and walls, which harboured much vermin.

There was no nursing staff or dispenser, and very poor provision for efficient work. Now, thanks to a generous Government, it can vie with most European hospitals in its sanitary and other equipment.

There are separate wards for Europeans, which term excludes Eurasians and all persons with any white blood at all. The native wards contain narrow spring mattress beds with red cotton bed-spreads, and no other bedding. As the natives are used to sleeping on the ground, this is luxury. The people who form the great bulk of patients are drawn from the peasant class. Their degree of intelligence is often very low. Many are stupid beyond belief, and during operations behave like monkeys or frightened horses.

Their dulness of intellect may be gauged by the lateness of the stage at which they seek relief. Cataracts rarely arrive until the second eye becomes too blind to allow the patient to get about alone. Morgagnian cataracts form 17 per cent. of the whole. Glaucoma is met with very frequently, and it is quite common for one eye to be in a condition of absolute glaucoma, and the other to have only "hand movements" or less. Acute primary glaucoma, as we know it, is a rarity, as one attack will very seldom bring the patient under treatment.

Several patients per week, on an average, arrive with panophthalmitis, the result presumably of corneal infection, the latter often caused by injuries from the nails, thorns, and from Muhammedan operations, with coincident lacrymal sac or conjunctival infection. Septic ulcers are rife. It is a common occurrence to see a patient with an eye long ago lost from septic ulceration—perhaps enucleated—come up with half the cornea of the remaining eye sloughing, and the anterior chamber filled with pus. They have learned no lesson, in spite of careful warning, as to the importance of early medical attention, from the loss of one eye. Many of these poor people, it is fair to say, come from long distances, and either have no money or no friends able to spare the time from their fields to bring them in. Seasonal incidence of disease depends mostly on the convenience of relatives and the seasonal rainfall.

Lacrymal sac trouble is very prevalent, a large number being complicated with fistula. Trachoma, too, is a common complaint, although not by any means universal, as in Egypt. That such good average results are obtained with such extremely unpromising material, speaks volumes for the methods employed. These methods it will be the writer's task to describe shortly.

Squint appears to be uncommon. Only four cases were noted during the period referred to in these notes. Congenital defects are frequent. Microphthalmic eyes, small corneas, persistent hyaloid arteries, membranes in front of the papilla, colobomas of iris and choroid, and curious retinal conditions of apparently congenital origin were frequently observed ; as also was congenital cataract. Of quite frequent occurrence, too, is night blindness in children, associated with xerosis of the conjunctiva. The cases seen were too young for obtaining any *data* regarding the colour fields, such as those noted by Sydney Stephenson[1] but in one case examined, the whole fundus was of a pearly-grey colour. They rapidly recover when fed on cod liver oil and liver. Retinitis pigmentosa is common, and consanguinity of marriage, which is usual among people of similar caste, is possibly a weighty factor in its production. Optic atrophy, primary and post-neuritic, is appallingly frequent. The ætiology of the latter type is quite obscure. The history—in adults—is very frequently that of headache, vomiting, and fever, sometimes associated with convulsions, and followed by gradual loss of sight. It has been suggested that such cases as are not specific in origin may be septic, from pyorrhœa or sinus disease. It is a point that would repay investigation.

Over 12,500 new cases attend the hospital annually, and about 1,500 operations are performed. To get through this mass of work, system and organisation are all important, and have been reduced by Colonel Elliot to a fine art. Routine is the god, as it must be where thorough and scientific work is insisted upon in circumstances in which it would seem almost impossible of attainment. The second in command is the assistant surgeon, Lieut. Craggs, an officer of the Indian Subordinate Medical Department. He is well versed in his duties, and is a tower of strength. Below him are five sub-assistant surgeons, in charge, respectively, of the out-patients, the dark-room (with refraction), the registrar's department (with pathology), and two in the wards. These officers are natives of India, and one cannot help being struck by the able, thorough, and conscientious way in which they carry out their duties.

There is a staff of four nurses, which it is intended shortly to increase, and they are assisted by native *ayahs*, but the work that in England is done mainly by nurses is done here by *peons* or porters. This is where discipline and routine triumph. These mean, native Tamils sterilise the instruments and dressings, carry out a particularly rigid aseptic ritual, and do it faultlessly; and it is doubtful if they ever heard of a microbe, or have any idea why so much care has to be exercised. They have been trained with military strictness to obey orders, and the slightest variation from each man's part in his allotted duties, or the most trivial fault, is promptly visited with a fine, to be deducted from his month's pay. They work like machines, and in this very fact lies safety.

In the out-patient room—work begins at 7 a.m. and continues till 11 a.m.—patients are seen by the sub-assistant, cases of importance or of unusual interest being reserved for the Superintendent on his morning visit. From here they are drafted off for dark-room examination, to the treatment room, or to the wards for admission. In the majority of instances, treatment at home is not attempted, as it would not be carried out, and the people attend daily to receive it. They are placed one by one on a couch, with the surgeon sitting at the head, clad in a white gown. On one side are two four-gallon glass reservoirs at a height, with tubes and nozzles, one containing mercury perchloride, 1 in 5,000, the other, saline solution. On the other side are the various remedies, in bottles, with sterile wool mops, made up of wool twisted round thin sticks, such as are used in the native brooms. Lotions, drops, or ointment are applied, or may be the lids are brushed with silver nitrate. They are thus very efficiently treated, and attend daily until recovered.

Septic operations are done in the out-patient room, a large room with two well-lighted tables, the patients on this day being seen in an adjacent room. This arrangement, however, is only temporary, as a new septic block has been sanctioned, whose foundations will be laid shortly; which, in addition to wards for men, women, and children, containing thirty-four additional beds, will have an operating room for septic cases, with a dark-room attached. It is intended by this means to keep septic cases entirely apart from the clean ones in all phases of their treatment.

The operating room proper is a large well-lighted room with white marble floor and white tiled walls. It contains two glass tables, placed so that the light falls full on the patient's face. Students are permitted to stand round the table. An ante-room contains the electric steriliser, where instruments, dressings, and coats are purified. Between the two there is a window opening, some three feet square, with a broad marble sill, on which the instruments are placed and handed out. All the rooms are provided with numerous porcelain basins and rose-sprays, actuated by elbow-arms.

An innovation is met with in the use of a special room for inspection of patients, which, although smaller, is like the operation room. It has high windows and two glass tables, with a small dark room as an annexe. The idea is that a good light and the best possible conditions are desirable if a definite opinion is to be formed as to the progress of a case. Consequently, every second day, each patient in the hospital is brought into this room and examined on the table, notes are dictated, progress is noted, and treatment is applied or varied as may be indicated. The only objection that might be urged by the European surgeon is the early disturbance of the patient in operative cases. This, however, is an instance of a variation to suit local conditions. The only exception made is that cataract extractions do not go to the room until the second day after operation. It may be here mentioned that although efforts are made to convince these patients of the advisability of lying quiet for as many hours as possible after extraction, a knot of them may be seen squatting on their heels comparing notes on their experiences a very short time after. This being the case, it would be mere pedantry to object to their walking to the examination room on the second day, and, as a matter of fact, no harm accrues, while the gain is conspicuous. At this routine examination, the size and mobility of the pupil, depth of chamber, and tension cf the eye are noted. If there is any suspicion of a rise of tension in a case of glaucoma under treatment, it is passed into another room for estimation by the Schiötz tonometer. Any drops indicated are instilled on the spot.

Operative Technique.

All dressings--wool and lint, cut into small pads—are sterilised daily by moist heat. The round tin in which this has been done is held by a *peon*, the lid opened, the required dressings are removed with forceps, and the lid is again closed. The mounted wool mops above referred to are kept in the same tin and used whenever swabs are required; this ensures a minimum of handling. The dressing used after all operations is a piece of dry sterile lint and a pad of wool, with a calico bandage of special, although simple, design pinned round the head. Sometimes, the lint is gone next day, and the wool rucked up,—obviously by the finger: no precautions would prevent this with some of these people. In spite of these dangers, however, accidents seem to occur but rarely.

A zinc rack, with compartments for six two-ounce bottles, containing respectively cocaine, atropine, eserine, adrenalin, dionin, and 12½ per cent. argyrol, is always to hand; it has a hinged cover and a handle like that of a bucket. A *peon* holds it, raises the lid without touching the bottles, and the surgeon takes the one he wants. They are ordinary chloroform drop bottles with glass stoppers; and the whole concern is sterilised daily by boiling, with the exception of the adrenalin, which is poured direct from the original receptacle into the sterile bottle.

A description of the procedure followed in cataract extraction may be given as typical of the methods employed in intra-ocular operations generally. Some points in connection with other special operations will then be adverted on.

The day before operation, the prospective patients are rapidly but thoroughly examined in the inspection room. Each is accompanied by his paper, on which are recorded notes of his present condition. The excellent system of record keeping which prevails in this Hospital may be referred to here. Cases of cataract, glaucoma, lacrymal sac trouble, and some few other conditions about which exact statistics are desired, have schedules, whose only analogy is with an income tax return paper. This ensures that no point is missed by the sub-assistant, and furnishes a wealth of valuable notes for statistical purposes. In cataract, particulars are noted of the state of the conjunctiva, lacrymal passages, cornea, diameter of cornea, tension, visual power, and projection.

On the day of final examination by the surgeon, the activity of the pupil, tension (as tested by the fingers), the state of the lids on eversion, and of the lacrymal passages (as evinced by pressure over the sac), are rapidly investigated; and, after a glance at the notes, the patient is either passed for the morrow, or postponed for further treatment, or what not. On the afternoon of this—the day before operation, each patient is seated in a chair, the eyelashes are cut short and the conjunctival sac is thoroughly washed out with sterile water. Atropine is instilled, and a trial dressing applied with a bandage and left on all night. Next morning—operations begin at 7.15 a.m.—if there is much secretion after the trial bandage, the case is rejected for further treatment of the lids with silver nitrate.

If accepted, the patient, just before entering the operation room, after an instillation of cocaine, has the conjunctival sac irrigated with mercury perchloride, 1 in 3,000, for several minutes, the eyelids being everted. This makes the eye very red and causes a free secretion of mucus. Colonel Herbert, who introduced the method, believed that microbes lurking beneath the surface were extruded along with the mucus. If a conjunctival flap is made, the congestion is apt to lead to troublesome hæmorrhage, and Herbert got over this by using adrenalin. Colonel Elliot does not care for adrenalin, but then he avoids conjunctival flaps.

In any case, one has to operate on a red and angry-looking eye; but although in most instances it remains injected longer than where perchloride is not used, yet this appears to offer no bar to a complete convalescence. Some conjunctivæ re-act much more strongly to it than others. Herbert and Elliot use perchloride irrigation in their white patients with healthy conjunctivas, as a matter of course, and would not dream of omitting it. These surgeons have shown that they have practically abolished suppuration in the cataract operation by this measure. In Madras, for instance, the percentage of suppuration, which was formerly 3·20, in spite of the usual antiseptic precautions, has been reduced to *nil*; and Colonel Elliot[2] has shown that it can only be ascribed to this measure. In Indian practice, at any rate, where the condition of the lids is very often bad, and always suspicious, and where cases are handled in a more or less wholesale manner, there can be no doubt that perchloride flushing is not only justified by results, but is absolutely indicated.

Cocain is instilled four times at short intervals, the final one being made while the patient is on the table. Except for the perchloride washing, no antiseptic is used from first to last. A light aluminium muzzle, covered with linen and moistened with perchloride, is worn by the operator and assistant; caps are not worn. The hands are dried after washing, and care is taken to keep them so while operating, lest accidental infection should run down the fingers on to the instruments.

The Listerian principle, as carried out in Madras, is no mere catch-word, but is expected actively to influence the operator and his assistants in every detail of their work. Woe betide the subordinate who makes a slip in this respect; while the visiting operator will discover to his surprise that there are several avenues of infection during an operation that had entirely escaped his notice. His attention will be politely but pointedly drawn to these, and if he is wise, he will make a mental note of them, and thereby improve his operative *technique*—for all these little matters are the outcome of a very large experience.

The patient walks into the room, and is placed on a glass table with his feet towards the window, from which a good light is obtained; a sterilised towel is put over the head. The conjunctival sac is then mopped out, with a sweeping movement, by means of the sterilised mops above referred to, the fornices especially being attended to. Normal saline is at the same time poured on to the eye from an aluminium vessel with a narrow spout.

A good deal of mucus is removed in this way. The edges of the lids are then compressed between the finger and thumb or two thumb-nails, to squeeze out plugs of sebaceous matter, which is wiped away with another swab, and the sac again swabbed out with saline. The speculum is now inserted, great care being taken while doing so not to foul it on the margin of the lids. If this is accidently done, a fresh instrument is at once obtained. Four sets of tools for cataract extraction are kept going at once, so that no delay may occur between operations, and that duplicates may be quickly available; for no instrument that goes into the eye is allowed to be used twice for that purpose without sterilisation. Before the day's work, the instruments are boiled for fifteen minutes, the knives for one only. Between operations, with a similar reservation. they are boiled for five minutes.

One of the most interesting and useful innovations in connection with extraction is the Madras method of opening the capsule before making the incision. A Bowman's cataract needle, with a slender shank and sharp blade, is entered in the limbus at the point where the knife will be entered for the incision. Using the blade after the manner of a knife, an attempt—usually successful—is made to cut out a central piece of the capsule with one sweep; failing this, a sufficient opening is made in any position desired. If this is done with care, no aqueous is lost. If it is, the incision can still usually be proceeded with without difficulty, or else, by placing the irrigator nozzle against the hole in the cornea, or waiting a few minutes, the chamber is readily filled; but this accident rarely happens. Besides the advantage of being able to incise the capsule more clearly and deliberately, there is this additional gain, namely, that one can determine whether the lens is hard, soft, or Morgagnian, and modify one's incision accordingly. The opening in the capsule can be made much more accurately with a full eye than with an empty one—and more safely.

The incision is made with a broad Graefe knife in the horizontal meridian, unless the preliminary needling has revealed the indication for a smaller one. It is placed in the limbus, avoidance of a conjunctival flap being aimed at. Colonel Elliot considers that the danger of infection from turning of the flap into the wound during the operation is a real one, as also is that of imperfect healing from its incarceration at the close, especially when the flap is small There is no doubt that blood does at times collect in the anterior chamber in a very annoying way in spite of the use of adrenalin, that the flap is occasionally, if small, cut off during the iridectomy, and that it obscures and renders more difficult that part of the operation. Some operators, however, contend that its virtues more than compensate for these disadvantages. *Tot homines, tot sententiæ.* One can only say that if the incision is cleanly made in the limbus, the wound heals without trouble.

An iridectomy is the invariable rule, and follows immediately on the incision. If the pillars are caught in the angles they are released at once by a stream from the irrigator before the cataract is dealt with. The lens is delivered by spoon pressure, a light touch above the scleral margin of the incision, and a firmer one directly backwards on the cornea at the level of the lower pupillary margin. The anterior chamber is then freely and boldly irrigated with saline solution of 0·7 per cent. strength.

Colonel Elliot advocated the routine use of this measure in cataract extraction as long ago as April, 1903[3], and has been using it ever since. The writer adopted it two years ago[4], and it was therefore with no feeling of surprise that he saw its important *rôle* in the operation. In Madras, no attempt is made to keep the temperature at body heat, but it must be remembered that the mean temperature is much higher than in England, while for many months it is over 100°F. A degree of force that would be surprising to the uninitiated can be used. Any tags of capsule in the neighbourhood of the wound are seized with Terson forceps, and removed by pulling towards the centre of the chamber. A piece of cortex that had been lodged behind the scleral lip of the incision is by this manœuvre often brought into view, and can then be readily washed out. If this piece is obstinate, no hesitation is felt about turning the stream directly under the scleral lip, the aim being to leave no cortex at all behind. (If this aim has been achieved, the patient leaves the hospital at the end of a fortnight with a quiet eye and satisfactory vision.) The pillars of the iris are now replaced by a gentle stream from the irrigator and the eye is closed, no instillation of any kind being made. The dressing applied is a piece of dry sterile lint next the eye and a pad of cotton wool; no adhesive strapping and no shield. Both eyes are bandaged for four days.

The eye is not disturbed for two full days unless pain be complained of. Atropine is instilled and a clean pad put on at the end of forty-eight hours. Cases are then inspected in the examination room every second day. On the ninth day, if all goes well, the bandage is replaced by a shade, and on the fourteenth, if the vision is 6/18 or better, the patient is discharged. If the eye is not perfectly quiet, or the vision is not up to the above standard, the patient is detained in Hospital until it has improved or the reason for its inability to do so has been ascertained and remedied or noted as unalterable.

Needling is not often done, as the patients are satisfied with only moderate acuteness of vision and do not return. Colonel Elliot holds very strong views on the impropriety of early needling—that is, earlier than six weeks. When the opportunity does occur, two needles are used, and the patient is prepared as for a major operation.

It may not be out of place to mention here that between each operation, while washing the hands, notes are dictated and entered under their proper headings on the patient's schedule regarding all details of the operation; notes are also dictated at each inspection. If a patient turns up at any time subsequently, his schedule is readily available, and his condition is noted thereon by the registrar.

The foregoing method of preparing and handling the patient is resorted to before all operations.

Glaucoma, both acute and chronic, is treated by trephining. Before any treatment is begun, the tension is taken with the Schiötz tonometer and eserine instilled. Another tonometer reading is taken before operation, and again at intervals after. In trephining, a large conjunctival flap is dissected up, not only to the limbus, but for one or two millimetres beyond it, stripping up the conjunctival layer of the cornea at its natural plane of cleavage. An essential feature of Elliot's operation is that the trephined disc shall consist, in from 1/3 to 1/2 of its area, of clear corneal tissue; he gives the ciliary body as wide a berth as possible. The iris is dealt with only if it presents in the hole, or a peripheral iridectomy may be done in any case. This is quite easily effected through the two millimeter opening, but is done only to prevent subsequent prolapse. Eserine is used prior to operation, but atropine is instilled on the next and subsequent days to prevent posterior synechiæ, which seem prone to form if this is not done. The form of acute glaucoma set up by intumescent cataract is the only form for which trephining is not considered the most suitable procedure ; the soft lens matter is apt to bulge into the trephine hole. In these cases a broad preliminary iridectomy is done temporarily to lower tension, and the lens is extracted later.

The writer performed Verhoeff's modification of Elliot's operation twice ; Colonel Elliot also tried it. We used the author's sclerectome, which was apparently in good order. When screwing it home, the whole eye twisted with its movement in all the cases, and when, finally, it wrenched away, the opening was very small and had a rat-bitten look. It was used only on blind eyes. It was decided not to use it again. The instrument was placed in the museum. If a keratome incision is used, the writer would prefer to remove a piece of the anterior lip with the scissors, as being more effective and causing less trauma.

Congenital cataract is very common in India, and up to the age of 25 years is treated by breaking it up with a needle, and at the same sitting making a keratome incision in the limbus, and washing out the whole of the lens *débris* with the irrigator. Colonel Elliot's preference is for an iridectomy as well, although this may, of course, be omitted.

For iridectomies, a forceps is always used (never a hook) and ordinary scissors. The stop speculum is seldom if ever screwed down. Painful, blind, glaucomatous eyes, if not relieved by trephining, are treated by optico-ciliary neurectomy. The internal rectus muscle is temporarily divided, and Elliot's special hook is employed.

Dacryocystitis, as shown by retention, is invariably treated by excision of the sac. Conservative treatment is not suited to the conditions of Indian hospital practice. Chloroform is given, the sac exposed by a curved incision close to the canthus : the *tendo oculi* is not divided, and the sac is cleared by blunt dissection and snips with curved scissors. A probe is then passed down the nasal duct, and a spindle-shaped cautery destroys the mucous membrane. The incision, which is closed with three stitches, heals by first intention.

For panophthalmitis, chloride of ethyl is given on a mask, and the globe is eviscerated. The cornea is abscissed with knife and scissors, and the contents of the eye are removed by a special spoon suggested for this operation by Colonel Elliot, and made by Arnold and Sons, of Giltspur Street, London.

Entropion is treated by a modified Streatfeild operation.—An incision is made through the skin of the lid at the lower border of the tarsus, just clear of the hair-bulbs. A curved incision is made upwards from the extremities of this, and this piece of skin and the tissues down to the tarsus are removed with curved scissors. The tarsus being thus cleared, a wedge-shaped piece is removed from its whole length with a sharp knife, and three stitches inserted in such a way as to bring the lips of the gap in apposition. This procedure, while quite as effective as, is quicker to perform than, most others.

Hypopyon-ulcers, of which a large number are seen, receive the cautery, atropine, and Guthrie's section. They are nearly always in an advanced stage on arrival. An apparatus for iontophoresis is on the way out, and it is intended to give this method a thorough trial.

Vaccine therapy, although not used to any great extent, is employed in selected cases. With the advent of a fuller pathological equipment, a wider use will be made of it, if justified by reports from clinics where it has been in use on a large scale. Salvarsan is used in syphilis in some cases ; not in all, as its cost (fourteen shillings per tube) is prohibitive. It is employed intramuscularly, so far without sloughing or other mishap.

Saline injections are highly appraised in Madras. On Tuesdays and Fridays, the day set apart for them, there are some fifty or more cases receiving the treatment. Sterile salt solution of 0·7 per cent. strength is used, and great pains are taken to ensure sterility, an all-glass syringe and platino-iridium needle, the latter heated to redness between each injection, are made use of. One cubic centimetre is injected twice a week. The remedy is indicated in iritis, in interstitial keratitis, and to hasten absorbtion of cortex and of vitreous opacities. In these cases Colonel Elliot considers it has great value. It is also used for leucomata and in deep fundus changes.

Dionin is employed a good deal, and so is argyrol in 12½ per cent. solution. Trachoma is treated with roller forceps in an early stage, and silver nitrate solutions ; copper is not used. For old-standing pannus peritomy is done. A band of conjunctiva, two or three millimetres wide, is dissected off concentrically with the cornea, and the limbal vessels are scratched away with scissors.

Refraction is estimated under a mydriatic by retinoscopy by the officer in charge of that department and his assistants, and subjective tests are then made. There are two Sutcliffe's keratometers, and free use is made of them in suitable cases. Very careful and accurate work is done in this department.

The dark room is approached by a short semi-circular passage, whereby light but not air is excluded. Overhead electric fans and suction exhausts make for coolness, Electricity, which was introduced five years ago, is the only power used, and the fullest use is made of it. Except by the assistants, nothing but the Marple-Morton ophthalmoscope is employed. The ease and rapidity with which the fundus can be seen, and the greater degree of illumination and size of field, greatly impressed the writer. For direct examination it undoubtedly offers great advantages : it can be used with a " Flash " dry cell as well as from the main. The " indirect " method is not used here.

The dark room contains, besides the keratometer, a Thorner's magnifying ophthalmoscope. This requires the intelligent co-operation of the patient, but, given that, a truly wonderful and detailed view of the fundus, highly magnified, is obtained Another of these instruments is found in the dark room annexe of the inspection room. In the main dark room are also a Zeiss compound corneal microscope, with a magnification of some 20 diameters, a diaphanoscope of the latest pattern with a water-jacket, an optometer for use with the Hugo Wolff electric skiascope, a photometer, an Edridge-Green colour perception lantern,and an ingenious apparatus for the detection of the malingerer of night blindness, a common complaint, it would appear, among native soldiers. Each of these appliances has a compartment to itself, proper resistance being arranged in each case ; so that the patient merely has to be seated in position on a stool. and a switch turned on. These costly instruments are not regarded as curiosities, to be got into order at the expense of much time and trouble on rare occasions, but are intended for use, are kept in order, and are available at any moment. As there are few new appliances, however expensive, of any apparantly outstanding merit that are not tried in this clinic, one is enabled to examine into their merits and form an opinion as to their practical value.

Fundus examinations are very carefully done. The sub-assistant records the vision, refraction, and any other particulars in the way of present condition and history, and, after a fundus examination, makes a provisional diagnosis. These notes are read to the Superintendent, and he, while looking at the fundus, is simultaneously dictating further details of what he sees. Patients are thus rapidly reviewed one by one. The visitor who is interested in ophthalmoscopy will find enough material here, and interesting material too, to satisfy him. Besides this, he will find instruments of precision to help him to appreciate them, of such modern development and in such number as is doubtful whether he would find collected in any other institution devoted to ophthalmology. He will also have the good fortune to meet with a mentor with a very keen eye for small fundus changes, who is only too glad to demonstrate them to an appreciative observer.

A large sideroscope is in process of being installed, and a Volkmann's giant magnet already does useful work. Perimetry is done whenever possible, but this is less often so, and even then is less trustworthy, than in European practice. In most cases (not in all) of glaucoma it is quite impracticable, both on account of the late stage of the disease and of the stupidity of the patient. The visual acuity, however, is quite easily ascertained. A Bjerrum's screen occupies a place on the wall of the refraction room ; an interesting feature of this is that it has a half-inch thick layer of pith under the black cloth, in which marking pins may be stuck.

The pathological laboratory is at present in an embryo state, but no one is more appreciative of the value and importance of this subject that Colonel Elliot. The amount of pathological material is enormous, and it is only the difficulty of getting an increase of the staff sanctioned by the Government that has prevented the appointment of a fully trained man ere this. A grant of £400 has been passed for equipment, and this will be carried out on the same advanced lines as the clinical side of the hospital. A good Zeiss microscope is in use, and bacteriological examinations are made on the spot. Cultural work, however, is not yet undertaken. Eyes are bisected, mounted in formalin by the Priestley Smith method, described, and reference is kept of their history. At present, specimens are sent away for section cutting and histological report to another institution, where an expert pathologist is employed. In the meantime, Colonel Elliot extends a cordial invitation to any young pathologist looking for fresh fields of research. Six months could be well spent here by any man with sufficient training to be able to make use of the material. Every facility would be given him for research, with no stint of apparatus, on condition that he recorded his results.

There is a collection of eighty-four glass models, representing nearly every form of external eye disease, of most exquisite workmanship, made by Müller Söhne, of Wiesbaden. Their appearance is life-like, and they should prove a useful aid to teaching. There is also a good array of coloured pictures of the fundus, from Oeller's atlas. A good many native students attend the practice of the Hospital, and the clinical teaching is excellent.

In the refraction room is an epidiascope by Zeiss. This projects an image, such as that of a pathological specimen, on to a screen, which image can be magnified, if desired, some hundred or more times, a useful idea for study or demonstration purposes. A Leitz projectoscope is also in use. This instrument projects the magnified image of an object, such as a celloidin section on a slide, on to a sheet of paper, on which its outline can be traced. It can also be used in micro-photography.

Tuesdays are set apart for cataract operations, Thursdays for glaucoma and other intra-ocular procedures, and Saturdays for lacrymal sac, plastic, and all operations other than intra-ocular.

From the point of view of a maximum number of operations, the best time to visit Madras is in the hot season, in the middle of the year ; but as a compromise, January, February, and March are good working months, when there is plenty of work, and the climate is not unpleasant. November and December are wet months, when ploughing and sowing have to be attended to, and the operation for cataract not being urgent, is postponed in many cases to a more convenient season.

The writer was in Madras in the slack season in part, and, in addition, encountered the Durbar and Christmas holidays; but, in spite of this, was able to do over 200 operations. Among them were 117 cataracts and forty odd operations for glaucoma, also such uncommon ones, as optico-ciliary neurectomy and two cases of exenteration of the orbit. Performing operations thus, in quick succession—on one eventful occasion thirty cataracts were done by the writer in one morning, on another, fifteen glaucomas—cannot fail to be of great benefit to one's operative *technique*.

The cost of living in Madras can be set down at £15 per month, and the Bibby Line run a good service to Colombo, with very first-class accommodation at the same rates as P. and O. second.

The Madras Eye Hospital is not a "cataract punching shop" (to use a vulgarism) but a clinic conducted on scientific lines by a man who is bent on keeping it abreast of modern ophthalmic work, and which to visit is a liberal education in itself. Owing to Colonel Elliot's generosity, this privilege is available to anyone who obtains an introduction to him in the usual way, and who has already done sufficient work to be able to appreciate and to profit by what he sees. Colonel Elliot is anxious that men who come out should publish their work, partly that so much good material should not go to waste, for although he is an indefatigable worker himself, it is impossible for one man to keep track of every line of research, and partly, because he holds the view that it is only by this means that the highest standard of work is attained He wishes to claim no share whatever in such work himself, only expecting the usual acknowledgment of the source of the material. Visitors naturally must not be subversive of the hospital discipline, and, furthermore, those who desire operative practice are expected to appear not only on operation days, but to attend and to assist in the routine work of the hospital. In fact, he wants only enthusiasts. This is no hardship, for on one's daily visit to the out-patient room, he will find the new patients and a few of the more interesting old ones reserved for his inspection. Watching the progress of the operation and other in-patients at the tri-weekly inspection in the examination room is both interesting and instructive. And on visiting the dark-room, he finds a number of the most important fundus cases of the day, with dilated pupils, awaiting his arrival. The opportunity of acquiring manual dexterity, or of improving one's *technique*, by operating "in bulk," is, of course, a unique one.

Of Colonel Elliot's private hospitality this is not the place to speak. A genuine keenness in the progress of ophthalmic science is a sure passport to his interest, while daily contact with his enthusiasm is stimulating in the extreme, and is a privilege which the writer has valued very highly.

REFERENCES.

1. **Stephenson, Sydney.**—THE OPHTHALMOSCOPE, January, 1912.
2. **Elliot.**—*Indian Medical Gazette*, June, 1908.
3. **Elliot.**—*Indian Medical Gazette*, April, 1903.
4. **Smith, Temple.**—*Ophthalmology*, March, 1910.

TRANSLATION.

5.—GUIDE TO THE MICROSCOPIC EXAMINATION OF THE EYE.

(Continued.)

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Hæmatoxylin.

Hæmatoxylin, the colouring matter of the Brazilian campeachy wood (logwood), is found commercially in the form of crystals. It is the best and most certain nuclear stain. At the same time its action is slightly diffuse. The nuclei are stained dark blue, the protoplasm pale blue. Hæmatoxylin is very sensitive to acids, and is, therefore, not suited for staining tissues which have been hardened in them. Freshly prepared solutions act slowly; after a few days their power of staining increases, but in course of time again decreases. Solutions of hæmatoxylin do not, as a rule, keep well. Fungi develop and prove troublesome when they come into contact with the sections. Consequently, the staining solution should be filtered before use.

Previous to being transferred to the staining solution the sections are immersed for a short time in water, and after being stained they are thoroughly washed (for a quarter of an hour, or better still for several hours) to prevent subsequent darkening. Beautiful results are obtained by employing a very dilute solution (a few drops of the staining fluid in a glass of water), and leaving the section in it for perhaps 24 hours. The process is as follows:—

1. Immersion in water, for a few minutes.
2. Staining.
3. Washing, best for a considerable time.
4. Alcohol, 80 per cent.
5. Alcohol, 96 per cent.
6. Oil (not clove oil).
7. Canada balsam.

Hæmatoxylin readily overstains, that is to say, sections become too dark if immersed unduly long in the staining solution. They must, therefore, be examined from time to time in water. It is impossible to state how long the staining process should last. This depends not only on the solution employed but also on the method by which the sections have been prepared. An immersion of $\frac{1}{2}$-10 minutes is usually sufficient.

There are many formulæ for hæmatoxylin solutions; only the most common are mentioned here.

1. The simplest *hæmatoxylin* solution is a 1 per cent. solution of the dye in distilled water. This is bright yellow in colour, and suited for staining sections and also for staining in bulk.

2. *Alum-Hæmatoxylin* (Boehmer).—This is the oldest and most generally used solution. It is prepared in the following manner. Two solutions are kept in stock—

1. A solution of 1 gramme of hæmatoxylin in 30 c.cm. of absolute alcohol.
3. A 1 per cent. solution of ammonia-alum.

Some days before the stain is required the hæmatoxylin solution is added to the alum solution till a bright violet colour is obtained. The violet colour changes to blue on exposure to the light, and the stain is then ready for use.

3. *Delafield's Hæmatoxylin.*—The following solutions are mixed and exposed to the light and air in an unstoppered bottle for four days, and then filtered—

1. A solution of 4 grammes of crystalline hæmatoxylin in 25 c.cm. of absolute alcohol.
2. 400 c.cm. of a concentrated solution of ammonia-alum.

To the mixture are added 100 c.cm. of glycerine and 100 c.cm. of methylic alcohol; after two days the whole is filtered.

Delafield's hæmatoxylin stains more intensely and quickly than Boehmer's, and is at present much in favour. It can also be applied in a dilute form with good results. For the rest it behaves like alum-hæmatoxylin.

Hæmalaun (P. Mayer).—This stains like hæmatoxylin, and is therefore mentioned in this place. One gramme of hæmatein is dissolved by heat in 50 c.cm. of 90 per cent. alcohol, and mixed with a solution of 50 grammes of alum in 1 litre of distilled water. A crystal of thymol is added to preserve from fungi.

Hæmalaun possesses some decided advantages. In the first place, it is ready for immediate use; secondly, it acts very quickly; and, thirdly, overstaining is not apt to occur. Hæmalaun is therefore a favourite stain in some laboratories.

Ehrlich's Acid-Hæmatoxylin.—This consists of:—

Water	100
Absolute alcohol	100
Glycerine	100
Glacial acetic acid ...	10
Hæmatoxylin	2
Alum in excess.	

The mixture is filtered and ripened by exposure to light until it acquires a dark red colour. It is said to keep for years, if preserved in a well-stoppered bottle.

Heidenhain's Iron Hæmatoxylin.—See "Demonstration of the Karyomitotic Figures."

Benda's Sulphate of Iron Hæmatoxylin.—See ditto.

Weigert's Hæmatoxylin.—This is not a nuclear stain. It is employed to demonstrate the medullary sheaths.

Treatment of Overstained Sections.

Sections which have been overstained in hæmatoxylin and become too dark can be cleared up by various methods:—

1. The stain may be partially re-dissolved in a 1 per cent. solution of ammonia-alum. The section remains in this for several hours until the blue colour becomes bright violet, and is then thoroughly washed.

2. The depth of the stain may be reduced by placing the section in one-tenth per cent. solution of hydrochloric acid, and thereafter washing it for twelve hours.

3. The following is an excellent method by means of which a pure nuclear stain is obtained. It is employed by the author when he desires specially fine sections for demonstration, or when it is intended to photograph, or to make drawings of, the specimen. A contrast stain may be added with advantage. In successful cases the nuclei appear blue, while all else is pale (*e.g.*, the celloidin, which is always a disturbing element). The pale elements readily take up a contrast stain such as eosin. The procedure is as follows:—

1. Overstaining with hæmatoxylin for at least half an hour.
2. Washing in water for a short time.
3. Immersion in weak nitric acid (one drop of strong nitric acid added to a watch-glass of water) until the section becomes red.
4. Immersion in weak liquor potassæ (one drop, etc.) until the section becomes bright blue.
5. Washing in water.

The section must now be examined in order to determine whether it is sufficiently differentiated or not. The celloidin is decolourised first, the protoplasm next, then the nuclei, and, finally, the karyokinetic figures of the nucleus. If the differentiation is not sufficient, the section is placed once more in the nitric acid solution, and the process is repeated until the nuclei alone are prominent. This is conveniently determined by examination under the microscope, but the proper depth can also be estimated by the naked eye. Thus, the celloidin should be decolourised, also the sclera, which contains few nuclei. On the other hand, two distinct blue lines ought to be visible in the retina, corresponding to its stained nuclei. In conclusion, it should be noted that the sections must be thoroughly washed in order to prevent subsequent decolourisation.

A contrast stain may be added if desired.

Differentiation can be performed in the same manner by means of—

Acidulated Spirit.—This consists of:—

Concentrated hydrochloric acid	1
Alcohol, 70 per cent....	100

N.B.—The following principles should be adopted, when hæmatoxylin is employed. The author prefers Delafield's solution. The section should be overstained. It should next be washed in water for ½–1 hour, the water being changed frequently; then immersed in acidulated spirit until the celloidin is colourless, and the tissue assumes a reddish tinge. Thereafter it should be immersed in a weak solution of ammonia till it regains its blue colour; thoroughly washed in water; and counterstained with eosin.

Double Staining with Hæmatoxylin.

A double stain consists of a preliminary stain and a secondary or contrast stain. It is important to choose for the former a good nuclear stain, for the latter a diffuse stain which colours the protoplasm and formed tissue elements differently.

1. *Hæmatoxylin-Eosin.*—The preliminary staining is carried out with an ordinary hæmatoxylin solution, and should not be too intense.

The nuclear stain is more precise if the section is overstained and then differentiated in nitric acid and caustic potash in the manner just described.

After being removed from the staining solution (or the liquor potassæ) the sections should be thoroughly washed.

A few drops of concentrated aqueous solution of eosin are added to a watch-glass of water. The sections remain in this until they become faint rose-red (1–5 minutes).

They are rinsed in water containing a trace of eosin.

Eosin, unlike hæmatoxylin, is very feebly held by the tissues and is immediately extracted by liquids which do not already contain some of it. Hence a trace of it is added to the water and to the various alcohols with which the sections are treated.

Alcohol (eosin), 80 per cent.
Alcohol (eosin), 96 per cent.
Oil, or carbol-xylol and xylol.
Canada balsam.

The contrast staining can also be carried out in alcohol. A few drops of the solution of eosin are added to the 80 per cent. alcohol, and the sections are stained in this. Then they are transferred to stronger alcohol, oil, Canada balsam. An aqueous solution should be added to water; an alcoholic solution to alcohol.

Staining with eosin may also be accomplished if a trace of an alcoholic solution is added to the carbol-xylol.

The following stains have been recommended in place of eosin, and yield even more beautiful results:—

2. *Orange G.*—An anilin dye. A concentrated aqueous solution is prepared, and used diluted with water or alcohol.

3. *Aurantia* is employed in the same manner.

4. *Acid-Fuchsin.*—This is used like the others of the series, but, unlike them, is not removed by washing, so that care must be taken not to overstain.

Triple Staining.

I. *Van Gieson's stain*:—

1. Hardening in Müller's fluid or otherwise.

2. Imbedding in celloidin. Section-cutting.

3. Preliminary staining in Delafield's or Boehmer's hæmatoxylin. It is better to overstain the sections (half an hour), and not, as was originally recommended, to keep them in the hæmatoxylin for only three to five minutes.

4. Thorough washing in water.

5. Staining for a minute or two in a mixture consisting of a saturated aqueous solution of picric acid to which a few drops of saturated aqueous solution of acid-fuchsin are added before use. The depth of the fuchsin stain may, if necessary, be lessened by immersing the sections in a solution of picric acid.

6. Washing for a minute or two.

7. Alcohol, 80 per cent and 96 per cent.

8. Oil, Canada balsam.

Van Gieson's method is of the greatest importance. It ought to be employed whenever it is desired to contrast two different tissues sharply. Epithelium and endothelium stain a brownish-yellow, and stand out in brilliant relief against the bright red connective tissue. It is unsurpassed for demonstrating the connective tissue of the optic nerve in its normal and pathological conditions. The nuclei are coloured violet, the axis-cylinders red, and the medullary sheaths yellow.

Still more beautiful is the colouring if the following stain, recommended by Weigert, is employed:—

Hæmatoxylin (1 per cent. in absolute alcohol)	7
Liquor ferri sesquichlorati (4 per cent.)	5

The sections are washed and differentiated in a concentrated aqueous solution of picric acid, to which a solution of acid-fuchsin is added till the mixture becomes bright red. The sections should be overstained in the hæmatoxylin. The composition of liquor ferri sesquichlorati is given under "Elastic Fibres."

Alcohol. Carbol-xylol. Balsam.

II. *Biondi-Heidenhain Method.*

1. Hardening in corrosive sublimate.

2. Imbedding. The method was originally intended for paraffin sections, but it can be applied to celloidin sections provided these are thin. Otherwise the celloidin, which is also affected by the stain, proves a disadvantage.

3. Staining in a weak solution for six to twenty-four hours. The stain consists of—

Saturated aqueous solution of orange G. (8 : 100), filtered .	100
Saturated aqueous solution of acid-fuchsin	20
Saturated aqueous solution of methyl-green	50

These solutions should be made up separately, and allowed to stand for a few days in presence of excess of colouring-matter. The stain can also be procured from Grübler, ready for use. One part of the mixture, diluted with 100 parts of distilled water containing 2 drops of acetic acid, is employed. The solution is known to consist of the proper proportions, if a drop placed on blotting-paper leaves a mark which is bluish-green in the centre and orange towards the margin. If the margin is red, too much fuchsin is present.

4. Washing for a minute or two in 90 per cent. alcohol.

5. Dehydration in absolute alcohol.

6. Xylol, Canada balsam.

Resting nuclei stain blue ; nuclei undergoing karyomitosis and the fragmentary nuclei of leucocytes, intensely green ; protoplasm, fibrillar connective tissue, and the coloured blood corpuscles, red.

The method is adapted for staining tissues abounding in leucocytes. It has been used for the normal retina, and Birnbacher has discovered that the frog's retina reacts differently to this stain, according as the animal has been kept in the dark, or in the light, before the removal of the eye.

Carmine.

Carmine is one of the oldest and most popular of stains. It is principally a nuclear stain, but it tinges also the protoplasm of the cell body. It acts more slowly than hæmatoxylin ; its solutions keep better, and are not so sensitive to acids. For tissues which are difficult to stain hæmatoxylin is preferable.

Only one or two of the following solutions need be kept :—

1. *Alum-Carmine or Grenacher's Carmine.*—This stains the nuclei cherry-red, and is almost a purely nuclear stain. Overstaining does not readily occur.

2-5 grammes of powdered carmine are boiled for ½-1 hour with 100 c.cm. of a 5 per cent. solution of ammonia-alum. The solution is filtered when cool.

For use 3 or 4 c.cm. are filtered into a watch-glass.

Staining, 10 minutes to 2 hours.

Washing in water for a few minutes.

2. *Borax-Carmine* (alcoholic solution).—3 grammes of carmine and 4 grammes of borax are dissolved in 93 c.cm. of water. The solution is allowed to stand for 1 or 2 days, and then added to 100 c.cm. of 70 per cent. alcohol. The mixture is again set aside for several days, stirred occasionally, and, finally, is filtered.

Since this is an alcoholic solution, the sections are transferred to it from the 70 or 80 per cent. alcohol in which they are preserved, without previous immersion in water.

Staining for $\frac{1}{4}$ hour or longer. Overstaining does not occur.

Differentiation in acidulated spirit for about the same time.

Alcohol, 70 per cent.

Alcohol, 96 per cent., etc.

The celloidin is hardly tinged by this stain. The nuclei become bright red, the protoplasm remains pale. Borax-carmine is highly recommended.

It is also very suitable for staining tissues in bulk. Thin sections of delicate structures should be subjected to as few manipulations as possible. Hence it is convenient, instead of staining the individual sections, to stain the tissue *en masse* before placing it in the microtome. This method is applicable only in the case of small objects. These are stained for 1-3 days in borax-carmine, and are then washed in acidulated spirit, which is to be changed every quarter hour as long as it becomes coloured.

3. *Ammonia carmine* stains the nuclei splendidly, and also the axis-cylinders.

The sections are transferred from water to the stain, and are then washed in water. Alcohol. Carbol-xylol. Balsam.

4. *Borax carmine* (aqueous solution).—8 grammes of borax are rubbed up with 2 grammes of carmine and added to 150 c.cm. of distilled water. After 24 hours the liquid is decanted and filtered.

Immersion of the sections in water for a few minutes.

Staining, half to several hours.

Acidulated spirit, for the same time.

Alcohol, 70 per cent., etc.

5. *Lithia Carmine.*—3 grammes of carmine are added to 100 cm. of a saturated aqueous solution of lithium carbonate.

Staining for two or three minutes.

Differentiation in acidulated spirit.

Thorough washing.

Double Staining with Carmine.

1. *Alum-Carmine—Picric Acid.*—Preliminary staining with alum carmine for 10-30 minutes.

Washing in water for a few minutes.

Staining in a 3-5 per cent. aqueous solution of picric acid for 2-5 minutes. Some prefer an alcoholic solution.

Washing for a short time in water tinged yellow with a trace of picric acid.

Alcohol, 70 per cent., etc.

2. *Picrocarmine.*—Double staining is accomplished in this solution in the following manner:—

Powdered carmine	1
Liquor ammon. fort.	5
Distilled water	50

The carmine is carefully dissolved by stirring, and then there is added—

Saturated aqueous solution of picric acid	50

The mixture is allowed to stand in an open vessel until the ammonia has evaporated, and is then filtered.

Staining, 1 hour or longer.

Washing in 1 per cent. hydrochloric acid-glycerine tinged yellow by a trace of picric acid, for the same time.

Washing in pure water containing a trace of picric acid.

Alcohol. Oil. Canada balsam.

Orange G. or *Aurantia* may be used as a contrast stain after carmine.

Anilin blue can also be recommended. One or two drops of a concentrated aqueous solution are added to a watch-glassful of water. The sections are immersed in this for 1-2 minutes, either before or after receiving the carmine stain. If the blue tinge is too faint, it can be intensified by passing the section through acidulated spirit. If it is too deep, it may be weakened by immersion in a weak solution of ammonia.

Washing. Alcohol. Carbol-xylol. Balsam.

Nigrosin is employed in a similar fashion.

Alkaline anilin dyes (methylen blue, methyl violet, gentian violet, malachite green, vesuvin (Bismark brown) may be employed as nuclear stains in the same manner. A few drops of an alcoholic solution are added to the water in the staining dish. The sections are exposed therein for five minutes. They are then washed in water containing a trace of acetic acid. Alcohol, 70 per cent. Absolute alcohol. Xylol or cedar oil (not carbol-xylol). Balsam.

Safranin.

Safranin, one of the anilin dyes, is an important stain. It is employed principally for tissues which have been hardened in osmic acid or Flemming's solution, and which consequently do not take up hæmatoxylin and carmine well. With such material safranin produces a good nuclear stain.

Safranin	1
Absolute alcohol	100
Distilled water	100

The safranin is dissolved in the alcohol, and the water is then added. This mixture is kept in stock, and the sections are stained in it for 1 hour, or better still for 24 hours.

They are then washed in absolute alcohol for 5-10 minutes. Red clouds of stain are given off, and washing is continued till the celloidin is colourless. Acidulated spirit can also be used for differentiating, but in this case the chromatin of the nucleus alone remains coloured.

Cedar oil or xylol.

Canada balsam.

(*To be continued.*)

CURRENT LITERATURE.

NOTE.—Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—OPHTHALMOLOGY AND GENERAL MEDICINE.

(THIRD NOTICE.)

(1) Noll, H.—A further contribution on the origin of recurrent retinal and vitreous hæmorrhages in young people. (Ein weiterer Beitrag zur Entstehung der recidivierenden juvenilen Netzhaut und Glaskörperblutungen.) *Arch. f. Augenheilk.*, Juni, 1909.

(2) **Barrett, J. Boyd.**—Genetous type of imbecility with single ptosis. *British Journ. of Children's Diseases*, October, 1909.

(3) **Orlandini.**—The ocular symptoms of Meningitis, with special reference to the anatomical alterations of the Optic Nerve. (Sulla sintomatologia oculare nelle meningitis con particolare riguardo alle alterazioni anatomiche del nervo ottico.) *La Clinica Oculistica*, Nov., Dec., 1909.

(4) **Maynard, F. P.**—Preliminary note on increased intra-ocular tension met with in cases of epidemic dropsy. *Indian Medical Gazette*, XLIV, October, 1909.

(5) **Maynard, F. P.**—Preliminary note on increased intra-ocular tension met with in cases of epidemic dropsy. *Ophthalmology*, January, 1910.

(6) **Wiegmann, E.**—An unusual case of paralysis of accommodation after diphtheria. (Ein aussergewöhnlicher Fall von Akkommodationslähmung nach Diphtheritis.) *Klin. Monatsbl. f. Augenheilkunde*, April, 1910.

(7) **Wiegmann, E.**—On retinal hæmorrhages after influenza. (Ueber Netzhautblutingen nach Influenza.) *Klin. Monatsbl. f. Augenheilkunde*, April, 1910.

(8) **Stoewer, P.**—Atrophy of the optic nerve, retinal hæmorrhages, and œdema caused by compression of the chest. (Sehnervenatrophie, Netzhautblutungen, und Œdem infolge von Thoraxkompression.) *Klin. Monatsbl. f. Augenheilkunde*, Mai-Juni, 1910.

(9) **Taylor, James.**—Some ocular and visual conditions in medical cases. *Lancet*, January 14th, 1911.

(10) **Fleming, Percy.**—Some cases of medical interest met with in ophthalmic work. *Lancet*, January 14th, 1911.

(11) **Henschen, S. E.**—On circumscribed arteriosclerotic necrosis (softening) within the optic nerve, the chiasma, and the tractus. (Ueber circumscripte arteriorsklerotische Nekrosen (Erweichungen) in der Sehnerven, im Chiasma und in der Tractus.) von Graefe's *Archiv für Ophthalmologie*, Bd. LXXVIII, 1 Heft, 17 Januar, 1911.

(12) **Scalinci, Noé.**—The relationship between chronic retro-bulbar neuritis and arterio-sclerosis. (Rapports entre la névrite rétrobulbaire chronique et l'artério-sclérose.) *Archives d'Ophtalmologie*, avril, 1911.

(13) **Burnier.**—Tumour of the hypophysis and infantilism. (Tumeur de l'hypophyse et infantilisme.) *Ann. d'Oculistique*, avril, 1911.

(1) **Noll's** paper deals with hæmophilia as a cause of retinal hæmorrhages, and contains details of a case met with in a man, *æt.* 22 years, who himself was hæmophilic, and had two brothers suffering from the same affection. The hæmorrhages were confined to the course of the veins; none was situated along the arteries. There was no perivasculitis, and, with the exception of the remains of some old hæmorrhages, there were no other pathological changes in the fundus.

P. J. HAY.

(2) **Barrett**, of Dublin, has a communication dealing with "genetous" or "unclassifiable" imbecility in association with ptosis. In a mentally deficient child it is reasonable to suppose that both halves of the brain should suffer, so that the ptosis is more likely to be bilateral than unilateral. Barrett's patient, a girl aged 10 years, presented incomplete ptosis of the left eye, together with physical, physiological, and psychological stigmata of imbecility.

SYDNEY STEPHENSON.

(3) **Orlandini** points out that changes in the optic nerve are not such frequent complications of meningitis as are changes in the muscular or general sensory nerves of the eye. The optic nerve often remains entirely normal, and when changes arise, they are mostly in the vascular system and especially in the veins. In the cases of inflammatory alterations of the optic nerve, these are usually peri-neuritic or peri-vascular; they take the form of patches of exudate round the vessels, hiding their course.

In tuberculous meningitis, the changes in the optic nerve may be the mechanical result of the altered pressure conditions, or there may be true inflammatory changes, due to toxins circulating in the blood. The condition of stasis, which is largely mechanical, favours the production of the inflammatory changes, especially when there is tuberculosis of the choroid around the head of the optic nerve. Tuberculous change may develop in the sheaths of the optic nerve, either by direct extension from the meninges or as metastitic focus from a primary centre elsewhere. Inflammation of the nerve sheath may exist without any inflammation of the meninges of the brain or spinal cord. In a case examined by Orlandini, there was a large mass of tubercle developed in the outer part of the papilla; this mass distended the sheath, and the sclera in the corresponding region was much thinned. A considerable part of the globe was filled by the new formation. The retina became completely detached, and through it the tuberculous mass was seen as a yellowish-white lump. Microscopic examination showed a typical tuberculous structure. In this case, there seemed little doubt that the tuberculous process began in the infundibular end of the optic nerve sheath: the changes were limited to this region, and within a centimetre of the globe, the sheath was healthy.

H. GRIMSDALE.

(4) **Maynard**, of Calcutta, has come across more than twenty cases of increased ocular tension, during the last eight months, in patients suffering or recovering from epidemic dropsy. That there is a definite connection between the ocular condition and the general disease is, he considers, shown by (1) the frequency of the observed association, (2) the early age of most of the patients, and (3) the variation in type of the eye affection from ordinary primary glaucoma. All of the patients, except two, were under 36 years of age. On examination, the anterior chamber was found normal or deep, and the pupil small or moderately dilated and sluggish. There was sometimes complaint of pain, as well as of haloes and of dimness of vision but there was rarely any injection of the eye. Usually, the failure of vision followed the dropsy, but in some cases it was noticed at the same time, and twice it preceded the dropsical signs by a short interval. Two-thirds of the cases showed pathological cupping of the disc of from 2 D. to 6 D. in depth. There were no signs of inflammation of the uveal tract in any case. In some cases recovery took place, with or without a relapse; in others almost complete blindness was caused. The connection between the general and local conditions seems obscure; it may possibly lie, Maynard thinks, in the cardio-vascular phenomena of the disease.

H. HERBERT.

(5) **Maynard** (Calcutta) states that during eight months he has seen more than twenty cases of epidemic dropsy presenting increased intra-ocular

tension as a complication. The patients, with two exceptions, were under 36 years of age. They complained of haloes and dimness of vision, and sometimes of pain. "On examining them one usually finds the cornea a little steamy, the anterior chamber normal or deep, the pupil small or moderately dilated and acting but sluggishly to light, ... rarely is there any injection of the vessels. The tension of the eyeball is usually distinctly increased, sometimes it is normal and in one case it was diminished. . . . Usually the failure of vision follows the dropsy, but in some cases it is noticed at the same time, and in two cases it preceded the dropsical signs. . . . Two-thirds of the cases showed pathological cupping of the disc."

Maynard does not doubt that the disease from which the patients were suffering was the cause of the ocular symptoms. He writes this preliminary note to direct the attention of other observers to the condition. Some hypotheses which might explain the connection of the two diseases are discussed briefly.
A. J. BALLANTYNE.

(6) **Wiegmann's** unusual case was that of a boy, aged 12 years. Whereas accommodative power returned after diphtheria paralysis in the left eye in due time, it was still greatly diminished in the right eye, even after a lapse of three years. At the same time the right pupil was slightly larger than the left, and remained so even after the accommodation had become normal, also in the right eye. It is uncertain whether this inequality of the pupils was caused by the toxin diphtheria, or whether it signified congenital anisocoria.
C. MARKUS.

(7) **Wiegmann** observed extensive hæmorrhages of the retina in the left eye of a man, aged 28 years, who eleven months previously had gone through an attack of acute influenza, followed by protracted convalescence, a condition to which Franke has given the name of "chronic influenza." The right eye was normal. No other complaint was present which might have been the cause of retinal changes. The hæmorrhages, partly round and partly streaky in shape, disappeared completely in the course of some months. C. MARKUS.

(8) A young miner was seen by **Stoewer** three days after he had suffered a violent compression of the chest. Bright sparks were seen immediately after the accident, and everything appeared in a thick fog. The lids were suffused with blood. V.R. fingers at half a metre, V.L. 4/60. In both eyes the retinal arteries were slender, the veins dilated, and at the posterior pole were hæmorrhages and a grey discoloration of the retina indicative of œdema. A course of mercury and iodide of potassium was employed. It was only after a lapse of twelve weeks that the left fundus had assumed a normal appearance, apart perhaps from a slight contraction of the retinal arteries. V.L. 4/5. During this time the temporal half of the right disc had become distinctly pale, the field was found contracted and V. 2/60. No improvement took place subsequently.
C. MARKUS.

(9) We need make no apology for transcribing in full the *Lancet's* most excellent summary of the paper by **James Taylor**, of London, before the Medical Society of London, on ocular and visual conditions in medical cases :—

"Dr. James Taylor considered the subject in five sections: (1) conditions of the pupil; (2) conditions of ophthalmoplegia externa; (3) changes in the optic nerve; (4) retinal changes; and (5) hemianopia. In the pupil conditions inequality was not necessarily of grave significance. The Argyll Robertson pupil he referred to in its association with syphilis; it was said also to occur with lesions in the vicinity of the third ventricle. Dr. Taylor also mentioned its association with definite signs of tabes dorsalis, general paralysis of the insane, with paraplegic or hemiplegic symptoms, the results of syphilitic disease of vessels, and with wasting about the shoulder girdle, the result of syphilitic cervical pachymeningitis. It might also occur as an isolated phenomenon, and the case was mentioned of a man who had been under observation for 16 years with merely neurasthenic symptoms. He had recently developed deafness of both ears, probably of syphilitic origin. In speaking of ophthalmoplegia externa, isolated sixth nerve paralysis was alluded to, and the question was raised whether it ever resulted simply from neuritis due to exposure to cold. He pointed out that he had never met with it associated with the seventh nerve affection (Bell's paralysis). The sixth nerve frequently suffered from accident—probably because of its prolonged and exposed course—*e.g.*, in fracture of the base. Third nerve paralysis, isolated, was usually the result of syphilis, sometimes in tabes, sometimes as a precursor of general paralysis. Both these nerves might suffer in general brain conditions—*e.g.*, tumour, meningitis, etc.—and from toxic conditions such as diphtheria. In myasthenia gravis ocular palsies were one of the chief and early signs and varied much in intensity from time to time. Third nerve paralysis also occurred in the condition known as migraine ophtalmoplégique, probably as a result of an actual lesion of the nerve. He then referred to the occurrence of optic atrophy in tabes dorsalis, and demurred to the statement that it occurred in the pre-ataxic stage of tabes, because in some cases of tabetic optic atrophy no ataxy developed. It also occurred in general paralysis of the insane, not infrequently many years before the mental symptoms were present. The optic atrophy of disseminated sclerosis was also discussed. Optic atrophy also occurred in lesions at the chiasma, optic neuritis in such conditions being extremely rare. Optic neuritis occurred most commonly as a result of intra-cranial tumour. In spite of assertions to the contrary, it was frequently an early sign, and the impairment of vision which it caused might be the first thing to excite the attention of the patient. In four years at Moorfields Dr. Taylor had had referred to him no less than 20 patients with optic neuritis who went to Moorfields before seeking advice elsewhere. Optic neuritis also occurred occasionally in disseminated sclerosis. It also was said to occur in anæmia and as a result of other toxic conditions such as influenza. Neuro-retinitis occurred in glycosuria and albuminuria. The condition of retinal thrombosis and its symptoms were referred to and also the absence in many cases of any signs of associated visual disease. Occasionally cardiac hypertrophy was present. In the other cases a local arterio-sclerosis was probably the cause, and the long subsequent life of many who had suffered from retinal thrombosis would seem to indicate that it did not necessarily imply a serious general condition. Embolism of the central artery of the retina was also referred to and its occasional occurrence—namely, after diphtheria—without any recognisable sign of heart disease. Homonymous hemianopia, although usually occurring with hemiplegia, permanent or temporary, slight or severe, might be an isolated phenomenon, the result of vascular blocking frequently the result of syphilitic endarteritis. Bitemporal hemianopia was always the result of a lesion at the chiasma, occasionally associated with signs of acromegaly, frequently not.'

(10) We are indebted to the *Lancet's* abstract of the meeting of the Medical Society of London for the following notes of the communication by **Percy Fleming**, of London:—

" While elongation of the eyeball is the usual cause of myopia, the myopia might be due to refractive change in the lens. Ophthalmoscopic examination might or might not show the presence of fine lens opacities. Where there were no lens opacities examination of the urine would usually reveal the presence of sugar. Diabetes was also recognized as a cause of retro-ocular neuritis, but a much more common cause was tobacco or tobacco combined with alcohol. Although diabetes might produce typical retro-ocular neuritis apart altogether from tobacco, yet those cases were more often seen when the patient was a smoker, although the smoking might not be excessive.

"In patients over 45 one frequently met with a symptom which Mr. Fleming called morning ptosis. Such patients said that they had a difficulty in separating their lids in the morning, not because they were stuck together, but because they had no power to separate them. No definite paralysis of any muscle was found; and although there might be a condition of ill-health or weakness present, yet the underlying cause in the majority of cases was the presence of uncorrected or insufficiently corrected presbyopia. In connection with difficulty in opening the eyes in the morning the author referred to angioneurotic œdema. Again, another and much more serious cause of transient œdema of the lids was the presence of a chronic frontal or ethmoidal sinus empyema.

"While cases of paralysis of the cervical sympathetic were fairly common, being due to various lesions in the neck and thorax, irritation of the sympathetic was, in his experience, very rare indeed."

(11) The right eye of a patient became blind, and there was temporal hemiopia and hemiopic reaction of the pupil in the other eye (beginning with the loss of the upper-temporal quadrant only); there was also atrophy of both optic nerves. These symptoms point, as a rule, to syphilis of the chiasma, with implication of one tract or optic nerve, if an intracranial tumour, more especially of the hypophysis, can be excluded. But in this case **Henschen** found an arteriosclerotic process in the chiasma and optic nerve leading to softening, this process being very likely due to syphilitic endarteritis. There was also softening of the right occipital lobe and of the central ganglia.

R. GRUBER.

(12) **Scalinci** states that long clinical observation on his part has forced him to the conclusion that there is a definite relationship between abnormal conditions of the cardio-vascular system and chronic toxic neuritis, such as is produced by a combination of tobacco and alcohol in excess.

It is noteworthy that although the individuals who become affected with chronic retro-bulbar neuritis are usually heavy drinkers and smokers, yet at the same time cases are seen amongst those who make only a moderate use of tobacco and wine, or, indeed, make no use of them at all.

Further, young men are infrequently attacked, the cases being usually in people past forty.

How is it that young men who are heavy drinkers and smokers do not become affected so easily as older ones who may be much more moderate?

Scalinci considers that vascular changes can alone account for this, and that as a basis for the intoxication to take place, there must be a condition of arterio-sclerosis, more or less marked, at least in the immediate neighbourhood of the optic nerve. For some time past he has examined the cardio-vascular system in these cases, and in nearly all has found more or less evidence of diffuse vascular sclerosis. A short account of some twenty cases is given, and all support, to a greater or lesser extent, the author's ideas by showing evidence, such as increased blood-pressure, accentuation of the aortic second sound, tortuosity of superficial arteries, etc. He considers that there is a more or less pronounced alteration of the walls in those vessels from which spring the vaginal arteries which in their turn are responsible for the capillary network of the nerve trunk.

The fact of great improvement or even cure of the disease by treatment such as iodides and strychnine is no argument against the existence of arterio-sclerosis as its foundation.

Cessation of the toxin, combined with treatment, restores the tissue to its usual condition, but a further application of the poison will cause the trouble to break out afresh, the fundamental condition remaining the same.

Strychnine probably acts on the vascular walls, dilating the smallest vessels — in antagonism with the action of nicotine—and allowing a more complete nutrition and better elimination of the poison. The cases in which there is a difference in the visual conditions of the two eyes show clearly that the cause cannot be a purely toxic one, for then it ought to be equally distributed between the two eyes, but that an angio-sclerotic alteration is responsible, which has progressed unequally between the two sides.

The atrophy of the nerve frequently found is due, he considers, to the arterio-sclerosing changes, and in support of this statement, he quotes five cases of advanced optic atrophy where this condition was a marked feature.

Further support by analogy he finds in hereditary optic atrophy which very often presents the symptoms of a chronic retro-bulbar neuritis, and which may be regarded as being dependent on a precocious or congenital angio-sclerosis, similarly also with retinitis pigmentosa. BERNARD CRIDLAND.

(13) **Burnier's** patient, a male aged 26 years, measured 1m. 25 (49¼ inches) and weighed 32k. 500 (71¼ lbs.) He was fairly well-made and showed no signs of rickets, but his neck was short, so that his head seemed to rest on his shoulders. His skin was dry, cold, and wrinkled, but not myxœdematous. His limbs were free from adipose tissue, of which there was a marked deposit in an even layer on the abdomen and chest. There was complete absence of hair from the face, abdomen, and pubes. The voice was shrill and childlike, the skull rounded, the facies lunar, and the aspect aged. The thyroid was perceptible, but hardened and markedly atrophic. The external genitals were rudimentary, the testicles were undescended, and there was absolute sexual impotence. The cuti-reaction was negative, but the Wassermann was feebly positive. Radiographic examination showed enlargement of the sella Turcica, with slight thickening of the occipital bone and persistence of the metacarpal and radio-cubital epiphysary cartilages. Subjectively, there was persistent frontal headache, with occasional nausea and vomiting and tinnitus. Intellectually, the patient was infantile and lived a vegetative life. With regard to the eyes, there was neither exophthalmos, strabismus, nor nystagmus, but both optic nerves were atrophic. The right eye, which was said to have commenced to fail when the patient was ten years old, was blind, and the left, which in 1904 had V. 5/7, began to fail in 1910, and in February, 1911, its vision was reduced to 1/50 with narrowing of the field, most marked on the temporal side. Treatment for a month with thyroidine, orchitine, and injections of benzoate of mercury improved the vision to 3/50.

The author considers that the original lesion was a very slowly growing tumour of the hypophysis (as evidenced by the ocular symptoms and the signs of intra-cranial pressure), which was followed by troubles of the other internal secretion glands, so that the final condition was one of polyglandular insufficiency. From the positive Wassermann and negative tuberculine reactions, he concludes that the ultimate cause of the condition was probably syphilis, although there was no other evidence of the presence of that disease, either in the patient himself or in his family history. He insists on the fact that tumours of the hypophysis do not always cause acromegaly, which is probably due to hyperpituitarism, while cases like the one under consideration are to be regarded as resulting from hypopituitarism. R. J. COULTER.

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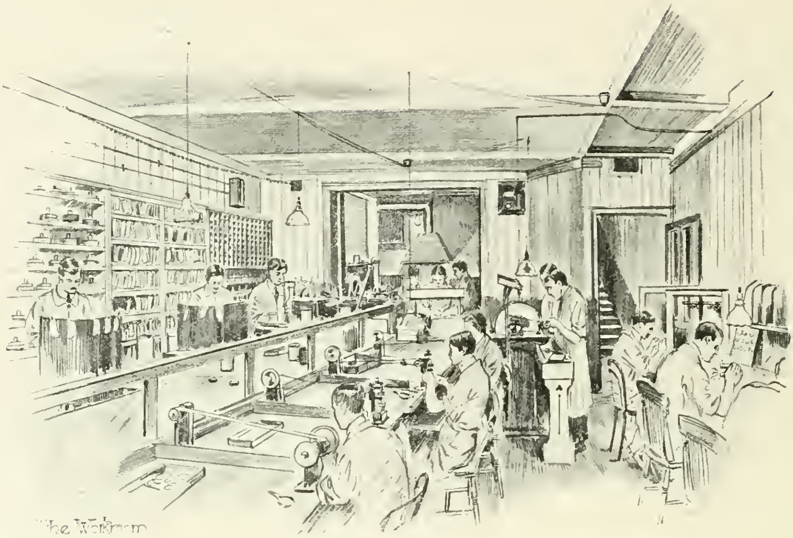

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(Extract.)

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II.—CONGENITAL ABNORMALITIES.

(SECOND NOTICE.)

(1) **Ask, F.**—A case of developmental anomaly of the lower canaliculus (Gutter-like depression of the edge of the lid.) (Fall von Entwicklungs Anomalie [rinnenförmige Einsenkung des Lidrandes] im Gebiete des unteren Tränenröhrchens.) *Zeitschrift für Augenheilkunde*, Februar, 1911.

(2) **Boulai, J.**—A case of congenital total absence of both eyeballs. *La Clinique Ophtalmologique*, 10 mars, 1911.

(3) **McCubbin, J. B.**—A case of congenital immobility, extrinsic and intrinsic. *American Journal of Ophthalmology*, March, 1911.

(4) **Cosmettatos.**—Fibroma and congenital enlargement of the orbit. (Fibrome et élargissement congénital de l'orbite.) *Ann. d'Oculistique*, avril, 1911.

(5) **Farnarier.**—On certain folds of the developing retina. (Sur certaines plicatures de la rétine en voie développement.) *Ann. d'Oculistique*, mai, 1911.

(6) **McCall, Eva.**—Two cases of congenital aphasia in children. *British Medical Journal*, 13th May, 1911.

(7) **Hosford, Stroud.**—Congenital dislocation of both lenses with corectopia in six members of a family of seven. *Trans. Ophth. Soc. U.K.*, Vol. XXXI, Fasc. 2, p. 50, 1911.

(8) **Magitot, A.**—Concerning certain folds in the developing retina. (A propos de certaines plicatures de la rétine en voie développement.) *Ann. d'Oculistique*, août, 1911.

(9) **Ryerson, C. Sterling.**—A case of complete double aniridia. *Canadian Practitioner and Review*, September, 1911.

(10) **Levy, A.**—Persistent pupillary membrane. *Trans. Ophthal. Society U.K.*, Vol. XXXI, Fasc. 3, p. 155, 1911.

(1) The case by **Ask**, of Lund, Sweden, looked exactly as though the canaliculus had been slit up, but when a probe was passed along the gutter-like depression, it slid out at the end, showing that the depression did not communicate with the canaliculus. The author notices instances of a similar deformity which have been published, and discusses the embryology.

T. HARRISON BUTLER.

(2) The case reported by **Boulai,** of Rennes, was in a female infant of ten days. The child was born at term, of healthy parents, and was otherwise normal in every respect. The conjunctival cavity was very small—only large enough to contain a lentil or a very small green pea. The mucous membrane of this cavity was reddened, almost purple, granular in appearance, and bathed in a slightly muddy serum.

ERNEST THOMSON.

(3) **McCubbin**, of St. Louis, has not been able to find in the literature any other case than his own of congenital ophthalmoplegia totalis. "Baby W., male *æt.* 6 weeks, well nourished. Bilateral ptosis, normal furrows in the lids being obliterated. The width of the palpebral fissures at the centre is reduced to about 2 mm. On raising the lids the right pupil is found to be moderately

dilated, the left more so. There is absolutely no pupillary reaction, direct or consensual to focal light. The right eye is turned slightly inwards. The left eye occupies the position normal for straightforward vision in the erect posture. This position the eyes maintain except for an occasional jerky movement inwards of the converging eye. There is no proptosis. The globes appear normal. The disks are very pale." It was found that even when employing some force with forceps, the eyes could only be very slightly rotated. The family history had no bearing on the case. Neurological examination revealed no lesions other than the ocular. Traumatism during birth could be eliminated. On the first visit a drop of atropine had increased the dilatation of the pupils. When seen at 13 weeks old, the ptosis was somewhat less marked. The pupils did not react to light. A small drop of eserine caused full myosis. The author then goes into the question whether the lesion is to be primarily attributed to the musculature or whether it is to be be found in the nervous system. He concludes that absence of nuclear development, as the primary cause of the condition, is the most logical explanation.

ERNEST THOMSON.

(4) **Cosmettatos** records the case of a man, aged 22 years, who gave a history that he was born with his right eye lower than the left, and that for five years it had been getting more prominent. The eye was proptosed and displaced downwards and outwards by a painless tumour, so that there was a space of 1.5 cm. between it and the upper orbital margin, and the floor of the orbit was correspondingly depressed. It was normal externally, but its vision was reduced to perception of light from optic atrophy. The left eye was normal. The base of the right orbit measured 5 cm. vertically and 4.5 cm. horizontally, and that of the left 3 cm. vertically and 4.5 cm. horizontally. There were two small fibrous tumours in the skin of the right cheek below the external canthus, but no other abnormality could be found.

Puncture having shown that the tumour was solid, it was removed through an incision in the upper lid, being easily isolated, except posteriorly where it was firmly adherent to the external wall of the orbit. Healing was normal, leaving the proptosis diminished and the eye higher than, but not on a level with, the left.

The specimen, which measured 4 × 2.5 × 1 cm., was found to consist of connective tissue, with a few elastic fibres and some star cells in a fibrous capsule.

R. J. COULTER.

(5) **Farnarier**, of Marseilles, has observed folds in the retinæ of both eyes of a rabbit, 5 days old, and of one eye of a sheep's embryo 135 mm. long. These were studied in serial section in one of the rabbit's eyes in which the region of the posterior pole was occupied by a considerable number of small crests (10 were counted on a surface of 25 square mm.) running more or less concentrically with the papilla, and having their axes either perpendicular to the retina or more or less inclined towards it. The first stage in the formation of these folds consisted in a sort of invagination of the cells of the external granular layer. As this increased in size, it pushed inwards the external reticular, which, in turn, displaced the internal granular layer, causing its internal surface to project into the internal plexiform layer. Later, the external plexiform layer disappeared and the two granular layers became mixed, while the inner surfaces of the fold became separated, giving it a club-shaped form. When fully developed, a typical fold measured 20 μ in length by 10 μ in breadth, the granular layers were separated by the external plexiform in its lower quarter but joined in a compact cellular mass in the remaining three-quarters, in which it was impossible to distinguish between the elongated nuclei of the neuro-epithelial cells and the rounded or oval ones

of the bipolar layer, while at the top there was no trace of either the internal plexiform or the ganglion cells. Degenerative changes took place at the summits of the folds which in some instances were so pronounced as to cause crateriform losses of substance.

The author argues that these folds cannot be artifacts because (1) the retina is not detached *en bloc*, but undergoes progressive invagination from the external cellular layers to the internal, (2) the base of the folds is often smaller than the summit, and (3) degeneration phenomena are present. He considers that they are due to a want of harmony between the rate of growth of the retina and the more external membranes of the eye, including the pigmented epithelium, and that the presence of cellular degeneration at their summits shows that they can not be pre-gliomatous conditions, as suggested by Seefelder with regard to some somewhat similar formations described by him in eyes from a human fœtus. R. J. COULTER.

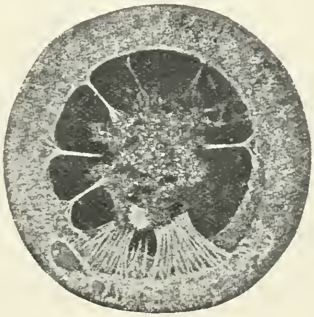
(6) **McCall**, of Cambridge, reports a case of congenital word-blindness in a lad of twelve years. Hearing and vision were normal. He recognized single letters, but was unable to interpret the written word. He drew well from still life. In short, except for the condition of word-blindness, he was a normal individual. SYDNEY STEPHENSON.

(8) **Magitot** criticises Farnarier's article on certain folds in the developing retina in the *Annales d'Oculistique* for May, 1911, and suggests that the appearances described were artifacts. He states that he has frequently seen similar folds in the eyes of 4th or 5th month fœti when fixed in various solutions of formol or osmic acid, and regrets that Farnarier did not give in his paper details of the method of fixation employed. With regard to the degeneration observed in the cells forming the folds, Magitot claims that malformations are caused by arrest of development or transformation of the cells and not by cytologic disintegration.

(9) J. R., aged fourteen, English. Had never been able to see properly, but could with difficulty read Snellen No. 8. Examination showed complete congenital absence of both irides. The lens in each eye had undergone spontaneous absorption, the capsules remaining as thin crumpled membranes, much folded and twisted, and dotted with cretaceous deposits. There were some floating opacities in the vitreous and the optic nerves were partially atrophic. The vision was not improved by glasses, owing to the membranous capsule. Needling of the capsule was advised but refused.

HANFORD MCKEE.

(10) The persistent pupillary membrane described by **Levy**, of London, is shown in the accompanying illustration.



III.—DYSTROPHIA EPITHELIALIS CORNEÆ.

(1) **Knapp, Arnold.—Dystrophia epithelialis corneæ (Fuchs), with the report of a case.** *Trans. Amer. Ophth. Society*, Vol. XII, Part III, 1911, p. 745.

(2) **Troncoso, Uribe y.—A case of dystrophia epithelialis corneæ. (Sur un cas de dystrophie épithéliale de la cornée.)** *Annales d'Oculistique*, février, 1912.

(1) Dystrophia epithelialis corneæ was the name applied by E. Fuchs (*see* THE OPHTHALMOSCOPE, 1911, p. 122) to a rare class of case affecting one or both eyes of elderly persons, mostly women, and characterised by diminished corneal sensibility, superficial diffuse opacity (especially in the pre-pupillary area), and roughening of the surface of the cornea, together with the production of small vesicles. The malady finally reduces sight to a low grade. Ætiology unknown, and treatment useless.

Arnold Knapp, of New York, reports, in a woman of 82 years, a case which he believes to belong to the foregoing group. The facts follow.—A cataract had been removed from one eye twelve years ago, with poor visual results. Knapp removed a cataract from the other eye without accident, and twenty-six days after the operation, the corrected vision of that eye was 10/200. The cornea then showed an uneven and finely stippled surface, and a faint superficial opacity. It was anæsthetic. In the meanwhile Knapp had read Fuchs's communication, which had led him to examine attentively the cornea of the other eye. It was partly opaque, with distinct small vesicles. SYDNEY STEPHENSON.

(2) The left eye of a female, aged 28 to 30 years, had been troublesome for about one year. When she was seen by **Uribe y Troncoso**, of Mexico, the lower two-thirds of the cornea was cloudy, dull, and of greyish-white colour. The surface was uneven. Sensibility was completely abrogated. Fluorescein gave no reaction. There was a little tenacious conjunctival secretion. Tension was normal. V. (corrected)=0·8. Treatment by dionine and collargol gave no appreciable results. SYDNEY STEPHENSON.

IV.—NEURO-EPITHELIOMA OF THE RETINA.

(1) **Knieper, Clara.—A case of double glioma retinæ, with enucleation of one eye and atrophy of the other one, for now nearly eleven years. (Ein Fall von doppelseitigem Glioma Retinæ mit Enucleation des einen und nunmehr fast elf jähriger Atrophie des anderen Auges.)** von Graefe's *Archiv f. Ophthalmologie*, 21 Februar, 1911.

(2) **Curt-Adam.—Statistical, clinical, and anatomical facts concerning glioma retinæ. (Statistesches, klinisches and anatomisches über das Glioma Retinæ.)** *Zeitschrift für Augenheilkunde*, April, 1911.

(3) **Caspar, L.—A case of hereditary glioma retinæ. (Ein Fall von vererbtem Netzhautgliom.)** *Centralbl. f. prak. Augenheilk.*, Juni, 1911.

(4) **Kleijn, A. de.—Studies on diseases of the optic nerve and of the retina. III.—On the question of spontanous recovery in gliomata retinæ. (Studien über Opticus- und Retina-Leiden. III.—Ueber die Frage der Spontanheilung in Gliomata Retinæ.)** von Graefe's *Archiv f. Ophthalmologie,* Bd. LXXX, Heft ii, 7 November, 1911.

(1) This is a contribution to the somewhat vexed question of the possibility of an eye with glioma retinæ becoming quiescent and phthisical; the whole literature on this subject being given and sifted. In **Knieper's** case the diagnosis was beyond question, since the first eye had been anatomically examined, and the glioma of the other one clinically diagnosed at the same time. The patient, whose parents had refused permission for excision of the second eye, was casually met by Leber while inspecting an institution for the blind. It seems likely that the atrophic condition of the eye will now remain stationary, although cases of late recrudescence of the process have been observed. R. GRUBER.

(2) **Curt-Adam**, of Berlin, reviews all the cases of glioma retinæ which entered v. Michel's Clinic at Berlin between the years 1890 and 1909—a period of twenty years. They number only forty-seven, or one case among 5,832 out-patients. The percentage is 0·0172 against Wintersteiner's of 0·04. All the patients were under twelve years old, 94 per cent. of them being under four years. Wintersteiner's figures, which are larger than Curt-Adam's, give an equal incidence for male and female, and for right and left eye. A tendency towards heredity and family incidence was noticed. 8·5 per cent. were bilateral, against Wintersteiner's figure 24 per cent. Curt-Adam regards his figure as the more probable, although, personally, we should doubt it, since among 6,000 patients, we have noted three cases, two of which were bilateral. The prognosis is excellent if the eye be enucleated in the first stage of the disease. One hundred per cent. were free from recurrence after three years. If the disease has spread to the optic nerve, the outlook is very bad; only eight cases are recorded as having recovered under those circumstances. If the eye has ruptured, the prognosis is hopeless; the same is true of cases where recurrence has taken place. There is no recorded case of recovery. The only treatment is early excision. If the glioma has been present for some time, exenteration must be considered. In the third stage complete exenteration affords the only hope. T. HARRISON BUTLER.

(3) In 1892, **Caspar,** of Mülheim a. Rhein, enucleated the left eye of a child, aged two years, for glioma retinæ. The mother of the patient had a large congenital angioma of the left upper lid and forehead. The mother ascribed the occurrence of the yellow-looking tumour in her daughter's eye to the fact that in the second month of her pregnancy, she was frightened by a dog, whose eye gleamed yellow, jumping on her in the dark. In 1911, the same woman brought her grandchild, the daughter of the patient of 1892, on account of the occurrence of a similar looking yellow tumour in the right eye. The eye was enucleated, and was found to be filled with glioma. The grandmother ascribed this occurrence to the fact that her daughter, having become pregnant before marriage, had been scolded by her father, and had consequently wept much and lamented that she felt certain her child would also have a bad eye like she had had.

In connection with the above, Caspar states that out of about 40,000 cases seen by him, glioma occurred only three times, and that the frequency stated in the books, 1 in 3,000 to 5,000 cases, was much too high. A. LEVY.

(4) **Kleijn,** of Utrecht, first records the statistics of the Utrecht clinic. as to the results of enucleation for glioma retinæ. It must be mentioned

that after each excision of the eyeball a piece of the optic nerve is secondarily removed, even if the first section does not reveal any sign of disease.

	Number.	Recovered.	Dead.	Years after operation in cases recovered.
Optic nerve microscopically sound	4	4	0	25, $3\frac{1}{2}$, $2\frac{1}{2}$, 2
Optic nerve affected but not up to point of division	6	2	4	8, 7
Optic nerve diseased, on place of division	5	1	4	4
Optic nerve not examined ...	3	1	2	24

The most interesting case is the one where recovery ensued, although the glioma was certainly not totally removed. Three months after the operation a tumour appeared in the other eye. Excision here was postponed and the case lost sight of. Four years later, the patient was found in an asylum for the blind, and the second eyeball, which proved greatly shrunk, removed. The contents of the eyeball were found to be excessively calcified and ossified, and filled with necrotic tissue, which, on examination, proved to be of gliomatous nature. R. Gruber.

V.—VISUAL ACUITY AND VISUAL TESTS.

(1) Haass.—On uniformity in determination of the visual acuity. (Ueber die Vereinheitlitchung der Sehschärfenbestimmung.) *Wochenschrift f. Therapie u. Hygiene des Auges*, 26 August, 1909.

(2) Spengler.—Notice of the preparation of the international vision test in mirror-writing for a distance of 10 meters. (Notiz über Herstellung der internationalen Sehproben in Spiegelschrift für 10m. Abstand.) *Wochenschrift f. Therapie u. Hygiene des Auges*, September, 1910.

(3) Wolffberg.—Once again the international vision tests, in particular Landolt's position towards them. (Noch einmal die internationale Sehproben, ins besondere Landolt's Stellung zu denselben.) *Wochenschrift f. Therapie u. Hygiene des Auges*, 20 Oktober, 1910.

(4) Grow, E. J.—An "unlearnable" vision test card for use in the Naval service. *Ophthalmology*, January, 1911.

(5) Snydacker, E. F.—A useful addition to the test chart. *Archives of Ophthalmology*, March, 1911.

(6) Nicati, W.—Estimation of the professional ocular capacity in terms of the minimum visual angle. (Estimation de la capacité oculaire professionnelle d'après l'angle-visuel-limite.) *Revue Générale d'Ophtalmologie*, 31 mars, 1911.

(7) Armaignac,—The qualities which are indispensable for a good test-type. (Qualités indispensables requises pour une bonne echelle optométrique.) *Rev. Int. d'Hygiène et de Thér. Oculaires*, avril, 1911.

(8) Armaignac.—The qualities indispensable to a good optometric test-type. (Qualités indispensables requisies pour une bonne echelle optométrique.) *Rev. Int. d'Hygiène et de Thér. Oculaires*, mars et avril, 1911.

(9) Pardo, Ruggero.—The alteration of size and of form of images as factors of the diminution of visual acuity, estimated by perspective (L'alterazione di grandezza a l'alterazione di forma delle imagini quali fattori della diminuziona di V, determinata dalla prospettiva.) *La Clinica Oculistica*, Aprile-Maggio, 1911.

(10) Wolffberg.—Picture book for testing the visual acuity of children and illiterates. (Bilderbuch zur Sehschärfeprüfung von Kindern und Analphabeten.) *Wochenschrift f. Therapie u. Hygiene des Auges*, 6 and 13 April, 1911.

(11) Wolffberg.—International normal vision tests. (Internationale Normal-Sehproben.) *Wochenschrift f. Therapie u. Hygiene des Auges*, Juli 6, 1911.

(12) Ficker, H.—Comparative determinations of the visual acuity. (Vergleichende Sehschärfenbestimmungen.) *Zeitschrift für Augenheilkunde*, August, 1911.

(13) Marquez.—A new test-type. (Una nueva escala optometrica.) *Archivos de Oftalmologia Hisp.-Amer.*, Setiembre, 1911.

(1) **Haass**, of Viersen, supports strongly the recommendations of the Committee of the International Congress of Ophthalmology at Naples on the determination of the visual acuity. He further urges the withdrawal of the term "normal vision" in favour of Landolt's "unit visual acuity."

W. B. INGLIS POLLOCK.

(2) **Spengler,** of Hildesheim, has constructed test-types with Landolt's rings and Pfluger's hooks or figures adopted at the Naples International Congress, in mirror writing, and for a distance of 10 meters. They are suited for Roth's apparatus with artificial illumination. The reason for the distance of 10 meters is that the apparatus may be placed near the examiner, his trial case, and the patient. The signs can be indicated with a pointer, and, the author believes, with as great rapidity as in the appliances reviewed in THE OPHTHALMOSCOPE, Vol. VIII, 1910, p. 232. The distance is also taken for using with an optometer, the accommodation not being sufficiently relaxed with a nearer position.

W. B. INGLIS POLLOCK.

(3) **Wolffberg,** of Breslau, reviewing the recommendations of the International Committee, and a subsequent paper by Landolt ("Noch einmal die Sehprüfung," *Arch. f. Augenheilk.*, Bd. LXVII, 1910, S. 36) considers it is unfortunate that so few numbers are used, that there is no relationship in them to the interrupted rings, and that the new tests will only lead to confusion. There is no analogy between body length and visual acuity, as Landolt suggests in discussing the method of enumeration. The minimum angle of one minute may be taken as unit, but not as normal, since it is often surpassed. None of the present tables gives accurate results.

W. B. INGLIS POLLOCK.

(4) **Grow** credits Robert Hook (1674) with the discovery that the normal human eye cannot distinguish objects which subtend an angle at the eye of less than one minute. On this basis Snellen designed his test types, each of which subtends an angle of five minutes. Test types described as Snellen's vary a good deal in the size of the corresponding types. Grow has found the letters of the 20/20 line ranging from 7.4 to 10.6 mm. square. He estimates that these letters ought to have a measurement of 8.86 mm. square. One defect of most sets of test types is that they are more or less easy to learn. The author's test card contains ten rows of eleven letters, the first seven rows being of the 20/20 size and the three others of smaller letters. The screen or bracket on which the card is arranged is so constructed that any row of letters, vertical or horizontal, can be exposed as desired, and the possibility of learning the letters is thus excluded. A. J. BALLANTYNE.

(5) **Snydacker** has added to his test chart four squares, two in red, 2½ mm. and 5 mm. in size, and two in green, 3 mm. and 6 mm. in size. At the ordinary distance of six metres, he finds that patients who cannot distinguish the colours of the smaller squares are open to a suspicion of a colour defect, while patients who cannot differentiate the larger squares need careful perimetric examination. He gives reports of five cases in which he discovered a colour defect by means of these additions to his chart, which would otherwise have been overlooked, as vision was normal or nearly so in each case, and the fundus in three of the cases was normal; in a fourth there was some possible slight pallor of the discs, while the condition of the fundus in the fifth is not mentioned. Snydacker arrived at his conclusions by testing one hundred individuals with normal eyes as to the distances at which they could distinguish coloured squares of 2 mm. size. He found the average distance at which the red square was correctly named was 4½ metres, the green square a little under four metres. He also repeated these tests on a number of individuals with central colour scotomata, and found their colour scotomata were readily determined in every case by the use of the large squares only.

ROSA FORD.

(6) **Nicati** in this paper makes a brisk attack on those test-types, such as Monoyer's, which are based on the decimal principle, where it is a question of the estimation of loss of professional capacity. We should take as standard the minimum visual angle as used in astronomy, the angle one minute. Snellen's test of visual acuity remains his masterpiece. The question of visual acuity should be answered in angular measure, and the visual capacity should follow in accordance therewith. Each angular minute lost represents, according to Nicati, one tenth of the professional ocular capacity, thus:—

Minimum angle (angle limite).	Capacity.	Loss.
1′	1	0
2′	9/10	0·1
3′	8/10	0·2
4′	7/10	0·3
5′	6/10	0·4
6′	5/10	0·5
7′	4/10	0·6
8′	3/10	0.7
9′	2/10	0.8
10′	1/10	0·9

ERNEST THOMSON.

(7) **Armaignac**, of Bordeaux, in this article gives a "short synthesis" (which runs to about fifteen pages) of his previous publications on the subject

of test-types. He explains his reasons for preferring his own types to those of Monoyer and of the Naples Congress, going into the subject at considerable length, but as so much has been heard recently on this debatable subject, it seems hardly necessary to abstract this *résumé*. Nevertheless, the points are very clearly set out. ERNEST THOMSON.

(9) **Pardo** has investigated the acuity of subjects, using the ordinary test-types, but placing them at an angle towards the observer. By a simple calculation, he estimates the size of the surface thus presented, and is thus able to determine whether the deformation of the image by the skew position or the diminution of size has the greater effect on the visual acuity. His experiments go to show that the alteration of form has very little effect and the reduction of size is practically the all-important factor, even when the alteration in form is extreme : thus, in one case the test objects were rotated through an angle of 75° and the acuity was reduced to 5/12. The reduction of the size of the image accounts for 6/12 of the loss, leaving only 1/12 to be accounted for by deformity. HAROLD GRIMSDALE.

(10) **Wolffberg**, of Breslau, has published a new edition of his set of vision tests for children and illiterates, in which objects which closely resemble one another are chosen, but differing by features which do not subtend a greater angle than one minute, or at most two minutes. One set consists of a round teapot, a watch, and the moon with a face drawn on it. Another has an egg, a duck, a lamp, and a pair of spectacles. This last figure shows the weakness of the claims made by the author. The spectacles contain two ovals compared with the egg and the others ; while the duck with head, neck, and legs, has many points of distinction. On the whole, the figures differ very little from one another, and the author may be congratulated on the improvement he has achieved in tests for illiterates.

W. B. INGLIS POLLOCK.

(11) **Wolffberg**, of Breslau, brings forward again a new set of vision tests. He considers that Landolt's " rings " alone satisfy the conditions laid down by the International Congress of the " *minimum separable*," since the letters and figures in all others are recognised by the length or direction of the lines, which may subtend an angle of two to five minutes instead of one minute. The interval in the " rings " is square, and its diagonal diameter must therefore exceed an angle of one foot. He also considers that when Landolt places the opening at oblique positions, simplicity has been sacrificed, and accuracy may be lost by indefinite movements of the hand. His new " International Normal Vision Tests " have a white circle of one foot diameter placed at the centre of one of four black squares which are set around a central white square respectively above, below, right, and left. The squares have sides equal to three feet angles. The tests (which may be obtained from Optiker Emil Sydow, Berlin, N.W., 6) are arranged in single columns for rapidity of working. Several sets are mounted together, and can be shown alternately being moved directly or by the usual cord and pulley. The author further states that many " tests " are not accurate, and that each of his sets are carefully supervised before issue. The percentage enumeration should be discarded, and a return made to the unreduced fractions.

W. B. INGLIS POLLOCK.

(12) **Ficker** (Greifswald) in this paper records the results of determinations of visual acuity made for the purpose of comparing the efficiency of various test types. Schweigger's, Heine's, Weiss', Hess', and Löhlein and Gebb's test types were employed. Hess' types are international, and embody Landolt's cut ring with some cyphers.

The investigation showed that Weiss' types were the most inaccurate, and that Löhlein and Gebb's and Hess' were the most accurate. Had the author illustrated his paper with plates of the various types used, and taken a little more trouble in explaining the exact significance of his tables, it would be easier to follow his paper. As it is, it has, one fears, little value for English readers. T. HARRISON BUTLER.

(13) **Marquez** adopts as his unit a broken square, thus differing slightly from that of Landolt, whose type is a broken circle, and from de Wecker whose type is three sides of a square.

With this base, he has constructed a scale of nineteen degrees of acuity, extending from 0.1 to 2. HAROLD GRIMSDALE.

VI.—OPERATIONS.

(SECOND NOTICE.)

(1) **Brav, Aaron. — The rational treatment of acute glaucoma (Iridectomy empirical).** *Therapeutic Gazette*, November 15th, 1910.

(2) **Kuhnt.—On the operative treatment of partial corneal staphyloma. (Zur operativen Bekampfung partieller Hornhautstaphylome.)** *Zeitschrift für Augenheilkunde*, Dezember, 1910.

(3) **Goldseth, G.—Treatment of dacryocystitis.** *Ophthalmology*, January, 1911.

(4) **Cornwall, F.—Electrolysis in the treatment of indolent ulcers and fistulæ of the cornea.** *Ophthalmology*, January, 1911.

(5) **Martin, H. H.—A report on sixty cases of trachoma treated after the Coover method.** *Ophthalmology*, January, 1911.

(6) **Nicati.—Why iridectomy is indispensable in glaucoma : a word on disorders originating in the irido-choroidal ganglion. The indications and technique of drainage by puncture with the cautery. (Pourquoi l'iridectome est indespensable dans le glaucome : un mot sur les désordes d'origine ganglionnaire iridochoroïdienne. Indications et technique du drainage par ponction ignée.)** *Ann. d'Oculistique*, février, 1911.

(7) **Marin, Amat. — Some modifications of Panas's operation for entropion. (Modificaciones al procedimiento de Panas para las operaciones de entropion del parpado superior.)** *Arch. de Oftal. Hisp.-Amer.*, Febréro. 1911,

(8) **Blanco.—A new method of muscle shortening for the treatment of strabismus. (Nuevo procediemento de acortamiento mascular para el tratamiento del estrabismo.)** *Arch. de Oftal. Hisp.-Amer.*, Febréro, 1911.

(9) **Bonnefoi, Georges.—The performance of orbital heteroplasty. (La pratique de l'hétéroplastie orbitaire.)** *Archives d'Ophtalmologie*, février, 1911.

(1) **Brav's** paper is really composed of two portions, in one of which the causation of acute glaucoma is discussed and in the other its "rational treatment." The two portions are not, however, distinctly separated by the

author. The former portion, that concerning causation, contains a number of statements, some of which we are unable to follow, and others with which we are unable to agree. From his arguments the author arrives at the conclusion that, even in acute glaucoma, iridectomy is dangerous and, after all, not curative. The essential thing is contraction of the pupil by eserine, and treatment of the general condition of the patient. At the commencement, in order to get eserine to work, posterior sclerotomy may be done and the patient put to bed and given saline purgatives and hot applications locally. The intra-ocular pressure having been reduced, permanent re-establishment of the circulatory equilibrum should be sought by the combined method of free bowel movements and diaphoreses. The latter should be brought about by Turkish baths, not by drugs. The article contains so much that is contrary to accepted views, and at the same time so little in the way of definite reference to the host of modern writers on the subject, that the special pleading in favour of what he calls " rational treatment," as indicated above, loses much of the force which it might quite conceivably possess if more strongly buttressed by point to point argument. It is, however, a perennially interesting subject.

ERNEST THOMSON.

(2) **Kuhnt** (Bonn) after trying other methods which have not proved permanently satisfactory, has evolved the following procedure for the cure of large staphylomata.

At one sitting the various steps of the operation are as follows.—(1) A double-stalked conjunctival flap is cut concentric to the cornea 1-2 mm. wider than the staphyloma. (2) With a narrow knife the superficial layers of the staphyloma, and if it be near the corneo-scleral junction, of the limbus also, are pared away. (3) A broad peripheral iridectomy is made, and combined with a Lagrange scleral incision. (4) With delicate sawing movements the edge of the staphyloma nearest to the sclera is cut through with a narrow knife working from without inwards until the anterior chamber is opened. (The iridectomy has been made in another situation.) As soon as the opening is large enough, the blade of the scissors is introduced and the staphyloma separated along its semi-circumference. (5) This flap is now tested to see how much must be cut off to flatten the staphyloma and diminished to this extent by cutting of sickle-shaped pieces. (6) The two edges, staphyloma, and sclera are now sutured together with fine catgut. (7) The double-stalked conjunctival graft is now sewn upon the refreshed surface by the method described by Kuhnt in his last paper (*Zeitschrift für Augenheilkunde*, Bd. XXIV, Heft I.).

If cornea intervenes between the incision round the staphyloma, it must be removed before reducing the size of the staphyloma flap, for stitches hold badly in the cornea.

The paper contains photographs of the case described in which this operation was performed with excellent results. T. HARRISON BUTLER.

(3) The usual methods of treatment are described by **Goldseth**—in the acute stage incision and drainage, in the chronic stage excision of the sac. The author has found it advantageous in excising the sac to inject a few drops of one per cent. solution of pyoctanin blue through the canaliculus or through the anterior wall into the sac. This stains the wall, and lessens the likelihood of fragments of the sac wall being left behind. A. J. BALLANTYNE.

(4) **Cornwall** claims to have employed electrolysis for fifteen years in the treatment of the conditions named. He reports a case of superficial but extensive corneal ulcer cured by one application after some weeks' of orthodox treatment. A. J. BALLANTYNE.

(5) **Martin** advises Coover's method of scrubbing the trachomatous conjunctiva with sandpaper, but he modifies it by omitting the sterilisation

of the sandpaper, by flushing the conjunctiva afterwards with salt solution, and swabbing with 1-5000 bichloride solution, and by instilling once daily for eight weeks a saturated (40 grains to the ounce) solution of copper sulphate. Ten months after the beginning of treatment, Coover's method, unmodified, gave 80 per cent. of recurrences, while his modification showed 13 per cent. of recurrences. A. J. BALLANTYNE.

(6) **Nicati** considers that in glaucoma iridectomy acts as a resection of the iridic ganglion with secondary action on the choroidal ganglion, which removes the iridic irritability and the tensile choroidal contractions arising from it. In treating cases of idiopathic glaucoma the author first does an iridectomy with an incision only large enough to allow of the passage of an iris hook, and, if necessary, does a puncture with a cautery later, except in cases in which he judges that an iridectomy alone will be insufficient, when he does a puncture with the cautery and at the same sitting enlarges the opening with a knife and does an iridectomy through it. The puncture with the cautery is performed as follows.—A subconjunctival injection of cocain is given and the conjunctiva having been divided with scissors some distance from the corneo-scleral margin and undermined as far as the limbus with a white-hot cautery, the sclerotic is burnt 1 mm. from the corneal margin by successive touches of the cautery, each of very short duration, until the aqueous just oozes out. R. J. COULTER.

(7) The operation of Panas is not sufficient, in **Marin Amat's** experience, in cases of aggravated trachoma. He has modified it by omitting to dissect downwards from the primary incision, and by fixing, at the time of suturing, the skin below the wound over that above it. The upper flap forms a support to the lid margin and prevents re-inversion. HAROLD GRIMSDALE.

(8) **Blanco** has for many years been accustomed to fold the tendon of the muscle to be advanced without dividing it, but he has not been entirely satisfied with the results of this procedure, because the folded tendon forms a troublesome and unsightly mass, which recovers its normal colour but slowly. He has, therefore, devised this method to avoid these disagreeable features of the folding operation without greater risk of failure.

In the new method he makes an incision through the conjunctiva parallel with the corneal margin and over the tendon to be advanced; after this he divides Tenon's capsule and frees the tendon from the connective tissue surrounding it by an ample dissection. He then passes two squint hooks under the tendon, and separating them, sees that the tendon is really freed. He then replaces the posterior hook by the double hook devised by de Wecker, and takes firm hold on the tendon at the posterior limit of the dissection. Then drawing the tendon a little away from the globe he divides it just in front of the hook. He then fixes the posterior part of the tendon and muscle to the superficial surface of the tendon which has remained attached to the globe by means of a blanket stitch passed near the insertion into the sclerotic. HAROLD GRIMSDALE.

(9) **Bonnefoi**, of Bordeaux, extols the grafting of the rabbit's eye as a means of improving the prothesis. He maintains that the procedure is always a harmless operation, and that the stump thereby obtained becomes a mobile and prominent support for the glass eye.

The method, as performed now at Bordeaux, is described in full and differs slightly from that of Wicherkiewicz (for abstract *see* THE OPHTHALMOSCOPE, Vol. VIII, p. 282) in that the rabbit's eye itself is included in the sutures. The *technique* is as follows:

The day before the operation a rabbit of average size is obtained. The usual instruments for an ordinary enucleation are set out with the addition of four fine strabismus needles, several conjunctival needles, No. 0 silk threads, and four pairs of Vacher forceps or fixing forceps. Just before the operation two silk threads (No. 0) of a length of about 30 cm. are threaded with a strabismus needle at each end and a suitable number of conjunctival sutures are prepared.

Besides dressings, two receivers are arranged, one with oxygenated water, and the other with tepid sterilised water. When all is ready, the rabbit is killed by the classic blow on the nape of the neck, the palpebral commissures are enlarged with scissors and the eye is enucleated, taking care to, remove with it as much muscle as possible and to have an appreciable amount of the optic nerve trunk. The globe is then placed in sterile water resting with the. cornea downwards on a sterile pad. The patient is meanwhile anæsthetised and the operation performed in two stages, namely, enucleation and grafting. In the enucleation it is important to keep as much conjunctiva as possible to be able to cover up the stump well. The four recti are seized with the four pairs of Vacher forceps which are laid in the direction of the muscle to which they correspond.

The eye is enucleated and the cavity plugged with a gauze tampon, avoiding any hæmostatic. The rabbit's eye is next prepared. Holding the globe in the sterile water between the finger and thumb, one needle of a double threaded suture is passed through the muscular *débris* representing a rectus muscle, on through the base of the nerve, transfixing it as close to the sclera as possible and beyond through the muscle *débris* of the rectus opposite to that punctured on entry. A second suture is similarly passed at right angles to the first, so that at the posterior pole of the rabbit's eye are found two threads fixed in a direction perpendicular to one another and approximately in the direction of the chief meridians, and armed with four needles, one at each end.

Next, turning to the patient, we see that all bleeding has ceased, wash out the cavity, and dry it. Taking the rabbit's eye by the four threads with the needles held between the finger and thumb, we place it in Tenon's capsule, held open by the four forceps clipped on the four recti muscles. The cornea of the eye is turned posteriorly, the stump of the nerve transfixed by the threads being anterior.

Taking up one of the patient's recti—external, for example—by means of the Vacher forceps, the corresponding needle is passed through it, similarly with the others. The forceps are then removed and the sutures tied, thus uniting across the rabbit's eye internal with external rectus, and superior with inferior rectus. The conjunctiva is next closed and the operation is complete.

Both eyes are bandaged for three days.

The success of this grafting of the rabbit's eye lies in its being placed with the cornea backwards, the idea originating some years ago with Lagrange. The improvement in the operation, as described by Wicherkiewicz, consists in suturing the rabbit's globe and muscles with the patient's recti, thus obtaining a much more complete union.

Bonnefoi holds that the operation is easy, harmless, causes no subsequent pain to the patient, and entails no risk of sympathetic ophthalmia, as with glass or gold balls.

It is contraindicated where there is infection, but is especially suitable in young people, in whom the best results are attained. Age, however, need not altogether be a bar, for the author records a satisfactory result at 65 years.

Failure can be due only to faulty asepsis during the performance of the operation.

BERNARD CRIDLAND.

VII.—REMEDIES.

(Third Notice.)

(1) Gradle, H. S.—The excretion of urotropin into the anterior chamber of the eye. *Ophthalmic Record*, March, 1911.

(2) Hicks, J. R.—The treatment of phlyctenular conjunctivitis. *Ophthalmic Record*, May, 1911.

(3) Bodeewes.—Pyocyanase and hypopyon-keratitis. (Pyocyanase und Hypopyonkeratitis.) *Wochenschrift f. Therapie u. Hygiene des Auges*, 15 Juni, 1911.

(4) Goebel, C.—The treatment of tabetic optic atrophy. (Zur Therapie der tabischen Sehnervenatrophie.) *Zeitschrift für Augenheilkunde*, September, 1911.

(5) Walter, O.—My experiences with "Terminol" in the treatment of trachoma. (Meine Erfahrungen ueber "Terminol" in der Trachombehandlung.) *Wochenschrift f. Therapie und Hygiene des Auges*, 5 Oktober, 1911.

(6) Bylsma, R.—A remarkable recovery (from night blindness). (Eine merkwürdige Genesung.) *Wochenschrift f. Therapie u. Hygiene des Auges*, Dezember 21, 1911.

(7) Lundsgaard, K. K. K.—The Finsen lamp or the Quartz lamp in the light treatment of tuberculosis of the conjunctiva, trachoma, and follicular catarrh? (Die Finsenlampe oder die Quarzlampe in der Lichtbehandlung von Tuberculosis conjunctivæ, Trachom, und Follikelkatarrh?) *Klin. Monatsbl. f. Augenheilk.*, Dezember, 1911.

(8) Krückmann, E.—Some remarks upon rheumatic diseases and the action of warmth upon the anterior part of the iris. (Einige Bemerkungen über rheumatische Erkrankungen und Wärmewirkungen am vorderen Augen-abschnitt.) *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1911.

(9) Igersheimer, J.—The action of Salvarsan (Ehrlich) upon the eye (the result of clinical and experimental researches). [Die Wirkung des Salvarsans (Ehrlich) auf das Auge. Nach experimentellen und klinschen Untersuchungen).] *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1911.

(10) Becker, H.—The treatment of syphilitic eye disease with Salvarsan. (Die Behandlung der syphilitischen Augenerkrankungen mit Salvarsan.) *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1911.

(11) Wray, Charles.—The treatment of conical cornea. *Trans. Ophth. Society United Kingdom*, Vol. XXXI, Fasc. 3, 1911.

(12) Ryerson, G. S.—On the use of radium in ophthalmology. *Ophthalmology*, January, 1912.

(13) Lawford, J. B.—On inoculation treatment in diseases of the eye. *Trans. Ophth. Society U.K.*, Vol. XXXII, Fasc. I, p. 1, 1912.

(1) **Gradle,** of Chicago, applied Hehner's test to the evacuated aqueous humour of rabbits fed on certain quantities of urotropin, with the following results.—(1) Urotropin is excreted into the anterior chamber of the eye in about three hours after ingestion *per orem*, reaches its maximum excretion in about seven hours, and is excreted in great quantities after repeated paracentesis. (2) The excretion of urotropin into the anterior chamber of the eye is remarkably increased by the use of a mydriatic locally. (3) Urotropin in the aqueous humour, in the concentration in which it occurs in the anterior chamber, does not inhibit the growth of virulent organisms in the test tube. (4) Urotopin is secreted with the tears under about the same circumstances, although in less time and in slightly greater concentration than in the aqueous humour; but here also it has no inhibitory effect on the growth of virulent organisms in the test tube. (5) Therapeutically, the urotropin in these secretions, although it does not kill, may weaken infecting organisms and allow them to be more easily attacked and killed by the normal antibodies in these and other secretions. Its exact therapeutic value must be worked out clinically. J. JAMESON EVANS.

(2) **Hicks** of New Brighton, N.Y., has successfully employed excision in three cases of phlyctenular conjunctivitis where the phlyctenules were large in size and few in number. He makes a triangular incision quite clear of the phlycten, which he dissects off, and the cut edges are then brought together with silk sutures—tension on the sutures being carefully avoided. Aseptic precautions are taken before, during, and after the operation. He does not advise the operation in the multiple form of phlyctenular conjunctivitis, because they do well on ordinary treatment, and because of the extensive areas involved. Should, however, these cases prove obstinate, he does not hesitate to curette the phlyctenules after opening them, or even dissect some or all of them out. J. JAMESON EVANS.

(3) **Bodeewes,** of Dortmund, reports three cases of hypopyon-keratitis, in two of which the hypopyon occupied a half and two-thirds of the anterior chamber respectively. The treatment consisted of atropine and pyocyanase drops, twice daily, with a moist bandage changed night and morning. The ulcers healed rapidly, and the hypopyon disappeared within three days in each case. The bacteriology of the ulcers is not mentioned.

W. B. INGLIS POLLOCK.

(4) **Goebel,** of Trier, first passes in review the various methods which have been advocated and employed to combat the progressive loss of sight in cases of tabetic atrophy. Of all these only mercury and strychnine have ever effected the slightest improvement, and this has been but temporary. The inevitable course of the disease is deterioration of vision, which may be steady, or marked by intermission, or even slight or evanescent improvement. The author has, however, achieved a striking success by massaging the optic nerve by using a sucker like Bier's vacuum cups. A bell, shaped like an eye bath, is furnished with a rubber ball. This is placed over the eye, and the lids and the globe are sucked in and out, the movements synchronising with the pulse rate. The case, which had made no progress with ordinary treatment, rapidly improved. The field of vision of the only useful eye, which was greatly contracted, enlarged to the normal limits, the sense of red, which had been lost, returned, and the other colour fields approached the normal. The improvement had been maintained up to four months from the inception of the massage. The paper is only a preliminary communication, for naturally Goebel is anxious to repeat the treatment upon other patients.

T. HARRISON BUTLER.

(5) **Walter,** of Odessa, reports the results of his experiences with

"Terminol" in trachoma, a remedy recommended by Grunert (*cf.* THE OPHTHALMOSCOPE, Vol. IX, p. 872). The manufacturer, however, Walter states, has been pushing this ointment of copper citrate for some months among the public of South Russia, urging the regular use, because, he said, 85 per cent. of the population were affected with trachoma. Walter prints Markow's latest figures giving an average of about 50 per cent.

In testing "Terminol" it was employed for one eye in the dry stages, as recommended, and the other eye was treated with copper sulphate or Pagenstecher's ointment, two of the oldest and most trustworthy drugs for trachoma. Walter concludes that in selected cases it does not effect more than a solution of copper sulphate or mercuric oxycyanate ; while in complicated cases it does not possess any therapeutic value.

The author recommends operative treatment first ; and when not suitable, either radium (it requires daily adminstration for a long period, and is therefore useless for a busy clinic), silver nitrate, or copper sulphate.

W. B. INGLIS POLLOCK.

(6) **Bylsma**, of Middelburg, reports the result of treating hemeralopia in two brothers with liver. The elder, aged eighteen years, had suffered from night-blindness for six years, and had to be led about after dark. The other, twelve months younger, had become suddenly affected while returning home a week prior to the examination. The family were all agricultural workers. The elder brother was not examined, but the younger had full vision in good daylight. Central vision, the visual field, and colour sense decreased with diminution of the light.

Treatment consisted solely of $\frac{1}{4}$ kilogramme (slightly over $\frac{1}{2}$ lb.) of cooked (roasted) liver from ox, calf, sheep, or pig, taken daily. Permission was given for the elder brother to have the same *menu*. Complete recovery was reported of the younger in four days, while the long-standing case recovered shortly afterwards. The author states that he has had several other successes in idiopathic night-blindness with the same treatment. Is it a case of organotherapy ? W. B. INGLIS POLLOCK.

(7) While **Lundsgaard**, of Copenhagen, does not deny the curative value of the Quartz lamp, and that it is easier to apply to the conjunctiva than the Finsen lamp, he maintains that the latter gives much the better results in the conditions named in the title of his communication. A. J. BALLANTYNE.

(8) According to **Krückmann**, of Königsberg, the chief characteristics of rheumatic iritis are its essential localisation in the anterior layers of the iris, the linear columnar synechiæ, the delicate nature of the precipitates upon the posterior surface of the cornea, and the entire absence of any signs of participation of ciliary body, choroid, and vitreous. The character of the precipitates is worthy of notice. In tuberculous affections these often arise in the angle of the chamber, and then, so to say, climb up the cornea, and for a long time may afford the only signs of a tuberculous uveitis. In rheumatic affections, on the contrary, the first signs of exudate are always seen upon the anterior surface of the iris. A delicate keratitis punctata appears later in the disease. Massive precipitation requires, as a rule, several weeks or months to develop, and is very unusual. In the late stages the fine fibrils of fibrin may form a network, and lead to occlusio and seclusio pupillæ. In these later stages precipitates may be found on the lens. The occurrence of recurrent and elective secretion of fibrin upon the unswollen and extended synchiæ is characteristic and is less frequent in other forms of iritis. Krückmann excludes rheumatism if the sphincter region near these synchiæ is œdematous. Another diagnostic symptom is the fact that in rheumatic cases the pupil may become fully, although irregularly, dilated after a few days apart from any treat-

ment. In such cases one finds a delicate punctate ring of pigment on the lens, showing that the synechiæ were linear and that there was no localised focus of inflammation. This process, the tearing apart of the synechiæ, may give rise to a large hyphæma which may be long in absorbing, but which eventually disappears. The appearance of peripheral areas of opacity on the posterior layers of the cornea is very characteristic. They form tongue-like vascular outgrowths which spread radially over Descemet's membrane. These are deeper than the opacities in sclerotising keratitis, and there is no pigmentation of the sclera. Later in the disease, a veritable post-corneal pannus is formed, which points to a commencing obliteration of the angle and leads to secondary glaucoma. The reader of the paper described the histology of such a case which had been examined by Lichtheim and Henke. The clinical picture is a parallel to the pannus-like growths seen in primary progressive polyarthritis. Just as articular pannus grows over the articulate cartilage, so this ocular pannus spreads over Descemet's membrane. Krückmann is an ardent upholder of v. Michel's teaching regarding ocular tuberculosis, and all cases of iritis which come to the Königsberg clinic are carefully examined so as to exclude this ætiological factor. He has, however, seen evil results follow the local reaction, and prefers to use very small doses (2:10,000 of the original fluid old tuberculine).

Attempts to utilise serological methods to diagnose rheumatic affections of the eye have not succeeded up to the present.

Large doses of salicylates and the local application of dry heat are the most valuable adjuncts to atropine instillation. It is, however, difficult to raise the temperature of the eye itself, which is always subnormal. It is not easy to utilise diathemic methods, high frequency currents, because the electric resistance of the eye is so great, and, in consequence, coagulation and burning occurs in the lids and skin before the temperature of the eye can be raised to the body temperature. Krückmann has tried radium therapy, using the respiratory and alimentary tract to absorb the emanation. It appears that rheumatic iritis reacts only slightly to this treatment. Pain is, however, greatly relieved by the action of radium. It has been suggested that the sodium monohydrochlorate of uric acid exists in two isomeric forms, one soluble, the other insoluble. Radium changes the insoluble compound into the soluble. Gouty iritis is far more amenable to radium cure, and excellent results have been obtained by respiring the emanation. It is, however, advisable at the end of a case of iritis, either gouty or rheumatic, to allow the patient to drink water containing radium.

Discussion.

Elschnig, of Prague, held that retro-corneal pannus was in nowise characteristic of rheumatic iritis. It could occur in any form of iridocyclitis. It is possible that "tubercular" iritis is not due to tuberculo-toxine, but to an auto-toxine formed in the body as the result of the action of tuberculo-toxine.

Schieck, of Göttingen, has found antibodies in the aqueous in cases of tuberculous iritis, but never in the rheumatic type.

Wessley, of Würzburg, has discovered that uric acid sodium monohydrochlorate injected into the anterior chamber of rabbits caused little or no inflammation.

Igersheimer, of Halle a. S., related two cases with a positive Wassermann, both tuberculous. The tuberculin reaction made the iritis decidedly worse, but antisyphilitic remedies—mercury in one ease, salvarsan in the other—effected a cure.

Lederer, of Teplitz, has achieved a great improvement in a case of gouty keratitis by radium inhalations carried out at the source-emmatorium at Teplitz.

Guttmann, of Berlin, thought much time might be lost by scientific investigation. He quoted v. Graefe, who, when his assistant told him that he could, in a certain case of iritis, find no history or sign of syphilis, said " All the same, let him have a course of inunction."

Krusius, of Berlin-Grunewald, referring to Igersheimer's remarks, pointed out that salvarsan had a definite action of some tuberculous processes such as lupus.

T. Harrison Butler.

(9 & 10) These two papers by **Igersheimer**, of Halle, and **Becker**, of Dresden, followed each other at the Heidelberg Congress, and as the discussion was common to them both, it may be well to consider them together.

Igersheimer has injected rabbits and dogs with salvarsan and has detected no pathological changes in the retina or optic nerve. Cats are more susceptible to arsenic, and in some of them degenerative changes were found both in the retina and the optic nerve. In others the hair fell out, a well-known sign of poisoning with organic arsenic. Clinically, Igersheimer has had most gratifying results with salvarsan, but he always combines it with mercury and iodide of potassium. He has not seen any improvement in congenital interstitial keratitis, nor in paralyses of the ocular nerves. Unless the treatment be combined with a course of mercury and iodide, relapses are frequent. He believes that cases of optic neuritis and of paralyses of ophthalmic nerves are due, not to the salvarsan, but to the syphilis.

Becker is an enthusiast for salvarsan, and he, too, believes the nervous lesions which appear to follow salvarsan injections all too frequently to be syphilitic and not toxæmic. He, too, combines mercury and iodide treatment with the salvarsan injections. Interstitial keratitis of congenital origin is uninfluenced, but the acquired form is greatly benefited. He gives an account of several cases in which the treatment was most satisfactory.

Discussion.

An animated discussion followed the paper, in which **Seidel, Krückmann, Pfalz, Wagenmann, Gutmann, v Hippel, Elschnig,** and others participated. There was a general agreement that salvarsan was beneficial in florid inflammations of the iris, and most of those who spoke had obtained no results in parenchymatous keratitis. The opinions concerning the nervous lesions were varied, but the majority held that they could not be ascribed to salvarsan. Krückmann narrated a case in which the optic nerves rapidly became atrophic after an injection of salvarsan. He had examined the case and found slight pallor of the discs, but no contraction of the field for colour or form. The development of complete atrophy was far more rapid than he had ever seen before in any case of tabes. The injection was given contrary to his advice.

The opinion was general that salvarsan should be administered by the intravenous route. Intra-muscular injections were not nearly so safe. There was also practical unanimity that unless treatment with salvarsan were combined with mercury and iodide of potassium, relapses were the rule.

T. Harrison Butler.

(11) **Wray**, of London and Croydon, urges the desirability of the early diagnosis and the rational treatment of conical cornea. Broadly speaking, he treats the condition on the following general lines.—The patient is advised to follow the most suitable occupation, to discontinue all reading, and to wear, as nearly as may be, the correcting glass. She must keep good hours, attempt no night nursing, and enjoy an abundance of fresh air and exercise. Copious

libations of water and intestinal antisepsis are of importance. The local treatment will depend upon the type of the malady. Wray distinguishes five such types, as follows, and describes the treatment suitable for each. (1) *One eye alone affected.*—A bandage is to be worn night and day over the diseased eye. The refraction of the sound eye is to be corrected. Wray mentions the case of a boy, aged 8 years, who was cured in twelve months. (2) *Both eyes about equally affected.*—Both eyes to be bandaged when in the house and at night, but when out for exercise, one eye to be kept open in the morning and the other in the afternoon. Correcting glasses to be worn when taking exercise and at meals. Neither eye to be opened more than about 2 mm., and both eyes never to be opened at the same time. (3) *Considerable difference between the two eyes.*—The worse eye to be bandaged night and day. The good eye, with correcting glass, to be used for getting about and meals, and to be bandaged at all other times, and not to be opened more than 2 mm. (4) *A true cone in one eye, and considerable astigmatism in the other.*—Treatment as in type (3), but cone to be cauterised if getting worse, or if stationary after three months' treatment. (5) *A true cone in each eye.*—Critchett's cautery operation is recommended, but it is to be regarded neither as the begining nor the end of treatment. Local and general measures must be carried out after operative procedures. SYDNEY STEPHENSON.

(12) In the opinion of **Ryerson,** of Toronto, it is advisable, in applying radium for the treatment of eye conditions, to filter the emanations through lead, tin, or aluminium, as the unfiltered rays are liable to lead to caustic effects. Applications of 10 to 15 minutes' duration may be made daily. They are usually followed by increased vascularity and slight irritation. The conditions in which radium has proved useful in ophthalmology are chiefly rodent ulcer, angioma, and epithelioma of the eyelids, trachoma, and spring catarrh. A. J. BALLANTYNE.

(13) **Lawford,** of London, selected inoculation treatment as the subject for his address as in-coming president of the Ophthalmological Society of the United Kingdom. He dealt with the subject on broad, general lines, but it would be difficult to abstract his remarks to any useful purpose. Those interested in the subject may be referred to the original.

SYDNEY STEPHENSON.

BOOK NOTICES.

Transactions of the Ophthalmological Society of the United Kingdom. Volume XXXII, Fasciculus 1, 1912. London: J. and A. Churchill, 7, Great Marlborough Street. Price 4s. net.

This fasciculus contains a report of the proceedings of the Ophthalmological Society at its first three meetings during the session, 1911-1912. It was issued to members in March, 1912. Such of its contents as are suitable will be abstracted in due course in the columns of THE OPHTHALMOSCOPE.

Transactions of the American Ophthalmological Society. Volume XII, Part III. Philadelphia: American Ophthalmological Society. 1911.

This substantial volume contains the account of the proceedings of the forty-seventh annual meeting of the American Ophthalmological Society held at New London, Conn., in July last. It is liberally illustrated.

CORRESPONDENCE.

[While The Ophthalmoscope will at all times welcome correspondence from its readers, the Editor does not hold himself responsible for any views expressed in this column.]

NOTES FROM SOME CONTINENTAL EYE CLINIQUES.

To the Editor of THE OPHTHALMOSCOPE.

Sir,—On page 150 of the March issue, in my article on "Continental Cliniques," the term "sclerectomy" appears as applying to the operation of de Vicentiis. The word should, of course, be "sclerotomy." No tissue is excised in this operation.

I am, yours, etc.,

Ernest Thomson.

London, *March 2nd*, 1912.

THE HUNTERIAN LECTURES ON COLOUR VISION AND COLOUR BLINDNESS.

To the Editor of THE OPHTHALMOSCOPE.

Sir,

My chief object in writing was to prevent those ophthalmologists who have obtained their knowledge of vision and colour vision from the indifferent and inaccurate accounts to be found in most of our text-books of physiology from believing that my views contravened some physiological axiom. However much I may deplore that so able a man, and one who has done so much good work on vision as Professor Burch, differs from me on the nature of the nerve impulse, I am inclined to think that the majority of workers on this subject agree with me. Dr. Head holds the same opinion for the afferent nerves. Professor Nagel writes on the point under discussion (*Physiol. des Menschen*, Bd. III, S. 10):—"The existence of three kinds of energy separating cones and fibres is not proved and is improbable, and if a three-fibre theory be still frequently spoken of, this is understood by the great majority of scientific men to mean that the three components are represented by three different stimulation processes which act upon one and the same cone." If the possiblity of these stimulation processes be admitted, why not five or more?

I am, etc.,

F. W. Edridge-Green.

Institute of Physiology,
University College,
Gower Street,
London.

March 4th, 1912.

NOTES AND ECHOES.

Deaths.

WITH regret, we announce the death of Dr. O. F. Wadsworth, a prominent American ophthalmic surgeon, a member of the American Ophthalmological Society, and formerly professor of ophthalmology in Harvard University.

Among other deaths in the United States, we notice those of Dr. Willard M. Smart, of San Diego, aged 62 years ; Dr. Charles M. Steele, of Reno, Nevada, aged 48 years ; and Dr. Edward S. Wood, of Minnesota, aged 50 years.

Dr. Ch. Guende, professor of clinical ophthalmology in the Marseilles Medical School, is dead.

* * * *

Appointments.

DR. RANSOM PICKARD has been appointed ophthalmic surgeon to the Royal West of England Institution for Deaf and Dumb Children, Exeter.

Mr. E. A. Dorrell has been appointed ophthalmic surgeon to the Eastern Dispensary, London.

Dr. James McCool has been appointed ophthalmologist to the Rose Dispensary, Terre Haute, Indiana.

Dr. Walter D. Weidler has been appointed assistant surgeon to the Manhattan Eye and Ear Hospital, New York.

Dr. O. G. A. Barker has been appointed ophthalmologist to the Mercy Hospital, Johnstown, Pa.

* * * *

The Berlin Chair of Ophthalmology.

REFUSAL of the Berlin chair of ophthalmology appears not to be wholly devoid of its compensations. For example, two of the three surgeons to whom it was offered have been decorated. Dr. Karl Hess has been given the Order of the Bavarian Crown, which carries with it a title of nobility, and Dr. Axenfeld has received from the Grand Duke of Baden the Commander's Cross of the second class of the *Zähringer Löwen.*

* * * *

The Ophthalmic Year Book.

WITH extreme regret we have to record the fact that, owing to the apathy of English-speaking ophthalmic surgeons, Dr. Edward Jackson, of Denver, Colorado, has been compelled to suspend for one year the publication of that admirable summary of the literature of our specialty, the *Ophthalmic Year Book*. The purpose is not abandoned, he tells us, but its ultimate accomplishment may be brought nearer by the suspension. It leaves the field open, and raises the question whether a volume such as the *Year Book* might be more popular if published at longer intervals with "those who have not learned to think it so important to spend money for the literature of their profession as to contribute to the church, or for the motor club, or to attend a college or society dinner." For comprehensiveness the *Ophthalmic Year Book* has no equal in our language. It well nigh passes comprehension how any ophthalmic surgeon can afford to be without it. Yet so it is. We can only hope that offers of support may now reach Dr. Jackson in such numbers as to render the interruption of the work impossible.

* * * *

Mr. Edward Nettleship.

MR. EDWARD NETTLESHIP has been selected for election into the Royal Society. This is a well-earned tribute to the value of his work on heredity, more particularly in relation to the Mendelian theory. We congratulate Mr. Nettleship upon having gained the blue ribbon of British science.

* * * *

International Congress of Medicine.

THE following programme of discussions has been drawn up by the officers of the section of ophthalmology of the Seventeenth International Congress of Medicine, to be held in London, in August, 1913:

SECTION IX.—OPHTHALMOLOGY.

1. The Pathogenesis of Chronic Uveitis, excluding the Syphilitic, Tuberculous, and Sympathetic Varieties. 2. Glaucoma Operations, with Special Reference to the Comparative Results attained by Iridectomy and its Recent Substitutes. 3. Affections of the Eye produced by undue Exposure to Light. 4. Anaphylaxis in its Relation to Ophthalmology. 5. "Demonstration" Meeting or a Discussion upon a Subject not yet Determined.

* * * *

Ophthalmia Neonatorum.

READERS of THE OPHTHALMOSCOPE will recollect that chief among the measures recommended for the prevention of ophthalmia neonatorum by the Central Midwives Board in a recent memorandum was the careful cleansing of the baby's eyelids by wiping them with clean material as soon as possible after the head was born. At a recent meeting of the Board, it is interesting to learn that a letter was considered from a certified midwife enquiring as to the antiseptics to be used for cleansing the infant's eyelids, as prescribed in one of the Rules. The Board decided to reply that the Board has designedly refrained from prescribing the use of specific antiseptics.

* * * *

Henshaw's Blind Asylum.

At the annual meeting of the subscribers to Henshaw's Blind Asylum it was stated that there was again a heavy deficiency on the year's working. The asylum gives the very best education, both elementary and technical, to 200 boys and girls and adults in the schools, and, in addition, the asylum authorities place within the reach of their pupils the means of livelihood which the blind people themselves above all things desire. In their own workshops they have 60 blind men and women, most of whom lived in houses of their own. They also gave weekly grants, amounting in the aggregate to £1000 a year, to aged and infirm blind people who were unable to work. About one-half of the blind people in the country lost their sight after reaching adult age, often after they had settled down in homes of their own with wives and children. The asylum educated, trained, and employed close upon 400 blind people ranging from infancy to old age. The annual expenditure was £2,984, with a deficiency on the income and expenditure account of £978, and an actual deficiency on the year of £1169. Hence the necessity for an appeal for more funds if the usefulness of the institution is to be maintained.—*Lancet*, March 2nd, 1912.

* * * *

Professor Lagrange.

A MOVEMENT is on foot to present a work of art to Professor Lagrange on the occasion of the inauguration of the new services of the ophthalmological *clinique* of the Bordeaux Faculty of Medicine. Subscriptions to Dr. Beauview, 81, Rue Mondenard, Bordeaux.

* * * *

Professor H. Dor.

ON March 24th last, an artistic plaquette was presented, at Lyons, France, to Dr. Henri Dor, honorary professor of ophthalmology in the University of Berne. Professor Dor's numerous English admirers are glad to add their felicitations to those of his friends, pupils, and colleagues.

* * * *

French Society of Ophthalmology.

THE Society will assemble at 8.30 a.m. on May 6th next at 184, Faubourg Saint-Germain, Paris. The discussion, to be opened by Dr. Rochon-Duvigneaud, deals with albuminuric retinitis.

* * * *

College of Physicians of Philadelphia.

OPHTHALMIC surgeons are very much to the fore just now in the counsels of the College of Physicians of Philadelphia. For example, at a recent meeting of the College, Dr. G. E. de Schweinitz was elected president, while Dr. W. Zentmayer was chosen on the committee of publication and Dr. A. Randall on the hall committee.

THE OPHTHALMOSCOPE.

A MONTHLY REVIEW OF CURRENT OPHTHALMOLOGY.

VOL. X.—No. 5.] *MAY 1, 1912.* [TWO SHILLINGS.

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ORIGINAL COMMUNICATIONS.

SCLERO-CORNEAL TREPHINING FOR GLAUCOMA SECONDARY TO CATARACT, AND FOR CERTAIN OTHER CONDITIONS.

BY

Lieutenant-Colonel R. H. ELLIOT,

M.D.(LOND.), F.R.C.S.(ENG.), I.M.S.,

SUPERINTENDENT GOVERNMENT OPHTHALMIC HOSPITAL, MADRAS, SOUTH INDIA.

THE following hitherto unpublished notes were written before I left India last May. They have been brought up to date by the inclusion of one case secondary to cataract, and one case of staphyloma.

In fifty-two cases the operation of trephining has been undertaken for the relief of a glaucoma that had supervened as a secondary complication of a cataract. Judging from the literature, one gathers that this form of glaucoma is comparatively rare in European countries. It is, however, all too common in India, for the simple reason that patients do not resort to surgical aid so freely as they do in countries where the general standard of education is higher. I have myself followed quite a number of such cases from an early stage of the cataract and witnessed in them the onset of well-marked secondary glaucoma. Of these cases, two stand out pre-eminent in my mind, as in both of them all vision was lost after an acute glaucomatous attack, although I had repeatedly and over a period of years advised both patients to submit to cataract extraction, and had pointed out to them the ever-present danger of an access of high tension. Both were presumably well educated men and one was exceptionally intelligent. We have on a number of occasions seen the onset of acute glaucoma in patients waiting in the Government Ophthalmic Hospital for cataract extraction, although they had come in with apparently normal eyes. In the present series, extending over a period of nineteen months, no less than three patients who had been admitted for primary cataract developed secondary glaucoma whilst under observation in hospital. In one of these high tension came on within twenty-four hours and in a second within twelve days of admission. In both of them the onset was presumably caused by mental worry and anxiety. The third developed glaucoma twenty-six days after admission whilst under silver nitrate treatment for lid conditions.

To judge from the communications one reads in ophthalmic journals, many European surgeons have failed to make up their minds even as to the existence of this complication of cataract. On the other hand, our out-patient room records show its occurrence in nearly fifty cases yearly. The appearance of the lens in these cases is characteristic of primary cataract, the history is unmistakable, and the existence of a primary, and hitherto uncomplicated, cataract in the opposite eye often clinches the diagnosis. At the best, the prognosis is a bad one, especially when one takes into consideration the fact that the patients too often lose valuable time after the onset of glaucoma before they make up their mind to resort to European treatment. To extract the cataract at once is far too hazardous. Our practice formerly was to perform an iridectomy and to await the settling down of the eye. When the globe had become quite quiet, extraction was undertaken. This line of treatment is by no means unsatisfactory, when the class of case is taken into account. But the necessarily large wound both of cornea and iris presents very distinct disadvantages as compared with trephining.

Of the 52 cases only 9 were below the age of 50 years, 18 were between 50 and 59 years, 22 were between 60 and 69 years, and 3 were over 70 years. The average works out at 55.3 years. An estimate of the average age of a hundred consecutive cataract cases admitted for extraction in this Hospital gave the figures 55.1. This is of interest, as it appears to indicate that glaucoma secondary to cataract does not specially select those advanced in age. I must confess to having started my review of these figures with an opposite preconception, based on Mr. Priestley Smith's interesting work. Of the 52, 20 were males and 32 were females. This is the more noteworthy, as many more males than females seek relief for cataract in this Hospital. Six cases were seen within a week of development of the glaucoma (3 of these have already been dealt with above), 8 more were seen from one to three weeks after glaucomatous symptoms supervened, 27 gave a history of one to six months, 3 gave longer histories, and in 8 no history could be got.

Another point of interest is the duration of the cataract before glaucomatous symptoms supervened. We have taken a good deal of trouble to collect figures under this heading, but have been baffled by two factors ever present in Indian cataract practice: (1) the less educated among the natives, and these constitute a large percentage of our hospital patients, date the onset of cataract from the time when they first noticed total blindness in that eye; this observation is commonly forced upon them only by the failure of the opposite eye, as cataract progresses in the latter; (2) patients of the class we are discussing are extremely vague as to the duration of time any disease has lasted, and will frequently give a history of ten days for a dense leucoma or a phthisis bulbi. Allowing for all this and without inflicting further details upon the reader, one is struck with the large number of cases in this series in which the history ranges from one to ten years. My point is, and it has been borne out by cases I have been able to follow, that, as a rule, glaucoma complicating cataract is the result of neglect on the part of the patient to appeal to surgical interference until long after the cataract is fit for extraction.

In the 52 cases the vision before operation was *nil* in 13, perception of light in one, perception of hand-movements in 30, finger-count from 1-2 metres in six, vision 2/60 and 5/10 respectively in the remaining two. There was slight improvement in vision in three cases, but obviously little could be expected in this direction until after the removal of the cataract. Our indication that trephining has been successful in such cases must, pending the extraction, be taken from the alteration in tension. Schiötz tonometer readings showed that the tension was very distinctly lowered in every case at the time of the patient leaving Hospital after an average stay of fifteen days.

Out of the fifty-two cases, only seven returned for extraction of the cataract, and in one case the lens was extracted whilst the patient was still in Hospital (*vide* below). This is a very meagre and disappointing total, when it is borne in mind that every one of these patients was particularly requested to come back, and that in those who had a reasonable prospect of vision after the removal of the lens, the recommendation to return was backed up by an explanation of the true nature of the operation. Unfortunately, it is quite clear that a large number of these patients placed no faith whatever in our explanation. The idea of the trephining operation is a new one to them, and there seems no doubt that a very large number of them lost all faith in us when they found their sight unrestored after an operation had been performed. It is likely that some of them resorted to other practitioners, and not a few to Muhammadan "couchers", whilst many have probably settled down in their villages to what they believe to be inevitable blindness. A special effort is now being made to obtain the addresses of all such patients, and so to get into touch with them. In all of the seven cases now under review the vision before trephining was perception of hand movements. In six of them it remained the same, whilst in one it improved to a finger-count at two metres. One case returned one month and thirteen days after trephining and was operated on in my absence by another surgeon; vitreous was lost and vision was not improved. In one, seventeen days after trephining, extraction resulted in a vision of finger-count at one foot. In the remaining five cases extraction was undertaken respectively ten days, fourteen days, seventeen days, one month, and two months after trephining, the corresponding vision being 5/30, 5/20, 5/50, fingers at six inches, and 5/50. In one case a fluid lens presented in the wound two days later, and it was necessary to remove it by making a section; the resulting vision was only hand-movements.

Our conclusions are that it is unsafe to perform a trephining when the lens is fluid or semi-fluid; we have confirmed the correctness of this conclusion by deliberately trephining blind eyes, the subjects of glaucoma secondary to intumescent or Morgagnian cataracts. The result has proved that although it is not invariably the case that such a lens will present in the trephine hole, there is at least a grave risk that it will do so. It is obvious that once the aqueous chamber has been emptied, there will be much risk of a fluid or semi-fluid lens being forced towards the point of lowest pressure. Once it projects into the trephine hole, it stops filtration and the effect of the operation is lost; indeed, we are worse off than before. In the case of a harder lens, in which glaucoma is secondary to cataract, trephining appears to be preferable to iridectomy. These cases of secondary glaucoma, as we meet them in Madras, are at the best very bad, and they are often desperate. The glaucoma is often of an acute or sub-acute type, and yet in the seven that we are reviewing, only one presented himself in less than a fortnight after the access of tension, four came between two to three weeks after glaucoma had commenced, one a month after, and one four months after. I believe that in all cases seen immediately after the complications set in, trephining is preferable to any other procedure, always provided that the lens is not fluid or semifluid in consistence. In the latter case I should perform a small iridectomy.

One more case, making eight in all, returned three months and twenty-four days after trephining, for extraction of the cataract; there was free filtration, the tension was normal, and the eye quiet. The cataract was extracted, during my absence, by Major H. Kirkpatrick, and the patient obtained a vision of 5/30 with a + 10 D. sphere before the eye.

In three cases trephining has been performed for the relief of glaucoma supervening in an aphakic eye after the removal of cataract. In the first case the patient had had an extraction eight years previously; for five years his vision remained good; then chronic glaucoma set in, and when he presented himself, his vision was reduced to hand movements. A successful trephining was performed and he was seen a year and three days later; the failure of vision had been arrested completely by the operation and the tension still remained normal (25 mm. Hg. by Schiötz tonometer). In the second case congestive glaucoma came on suddenly three months after a successful extraction, in which, however, a tag of iris had been left impacted in the wound. Vision on re-admission was 5/50; he was trephined one week after the onset of congestive symptoms and his vision rapidly rose to 5/30. He is still under observation, one month after operation, and is doing well. The third case is still more recent, but here, too, trephining seems to have arrested the progress of a glaucoma which followed cataract extraction.

In one case of a glaucomatous eye, with high tension and a leucoma, trephining was first performed, and the tension of the eye thereby reduced to subnormal. Seven months later, an iridectomy was safely performed for optical purposes, and the patient's vision was thereby raised from perception of hand movements to a finger-count at 1½ feet.

Out of a series of 278 consecutive trephinings performed by the writer, 14 were for the reduction of a staphyloma, 3 patients were below 20 years of age, 3 were between 20 and 30, 4 were between 30 and 40, 3 were between 40 and 45, and one was 49. They were, therefore, much younger in age than the usual run of our cases. Of the 14, only 2 were females, both of these being young (aged respectively 10 and 18). This disparity in numbers is accounted for by sex liability to injury, and by the reluctance of Indian women to come into hospital for operations dictated by choice rather than by necessity. Three of the eyes were blind and remained so; 9 had hand movements unaltered after operation; in one a vision of fingers at 2 metres improved when the patient was seen six months later to fingers at 10 metres and 5/50 E. types; in another a vision of 3/50 improved with the subsidence of the staphyloma to 5/30. In every case the staphyloma subsided with the fall in tension induced by the operation, and the patients went out distinctly improved; but in only [*]3 were we able to verify the results at a later date. These 3 returned respectively five months, six months, and six months after operation, and the result was satisfactory in each. It is to be remembered, however, that in staphylomatous cases there has probably always been chronic pericorneal inflammation. This is in most cases very likely to be associated with adhesion of the iris to the cornea; both these conditions are extremely unfavourable to the maintenance of a permanent and satisfactory result in trephined eyes, and one's prognosis as to the future must therefore be guarded. The results, however, have so far been sufficiently encouraging to make one persevere with the method of treatment.

One of these again returned to the hospital (during my absence from India) one year and eleven months after trephining; the tension was 12 mm. Hg. in one eye, and 14 mm. Hg. in the other. The vision in one eye had fallen from 5/50 after trephining to perception of hand movements now, owing to maturation of a cataract, while it remained the same (perception of hand movements) in the other eye; the staphyloma in each eye still remained inconspicuous.

ON THE SITE OF TREPHINING FOR GLAUCOMA: ITS IMPORTANCE.

BY

E. TEMPLE SMITH, F.R.C.S.E., D.O.Oxon.,

CHARTERS TOWERS, QUEENSLAND.

HOLTH, of Christiania[1] recently put forward the *obiter dictum* that "anterior sub-conjunctival sclerectomy is destined to be the basis of all future surgical treatment of chronic glaucoma." This attitude, one is led to believe, is becoming more and more widely adopted by thinking men in our specialty, and, indeed, may be said to be to-day the orthodox one.

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[*] P.S. December 5, 1911.

The writer was present at the Birmingham meeting of the British Medical Association, and gathered that the consensus of opinion among those present was not, however, in favour of adopting similar views with regard to acute glaucoma. Whether further experience of the newer operations in this connection will modify these opinions remains a question of time. Possibly it will.

The writer has recently had the privilege of spending three months in Lieut. - Colonel R. H. Elliot's clinic at the Government Ophthalmic Hospital in Madras, India. While there, Colonel Elliot, with great generosity, placed the whole of his large amount of clinical and statistical material dealing with trephining at his disposal for investigation. The writer has had the opportunity of seeing the operation done often and of doing it himself some thirty odd times.

It is not proposed in this communication to attempt to justify the operation *qua* operation by reference to results or to statistics. This has already been done by Colonel Elliot in papers read at the Ophthalmological Society[2], at Oxford, and at the Birmingham meeting[3]; and further results and statistics will be forthcoming in due course.

It is only intended to emphasise points of detail in the operation elaborated by Elliot, points, as it seems to me, of such importance that no apology is needed for their reiteration.

The historical aspect of the question has been ably dealt with by Sydney Stephenson[4], but, as trephining for glaucoma is still sometimes spoken of as the "Fergus-Elliot" operation, the essential difference between the operations done by these surgeons cannot be too clearly borne in mind. So vital is the difference in procedure and aim between the two that the future of trephining may be said to stand or fall on its just appreciation.

Dr. Freeland Fergus's own account of his operation is as follows:—"My operation is only a modification of that of Lagrange; it is merely an easier and more convenient way of performing it. If Lagrange's operation is bad, so is mine; if Lagrange's is good, mine is only a simpler way of performing it. A large conjunctival flap is dissected up, as for the operation of advancement. Then the trephine is used to remove a piece of sclera as near to the cornea as possible. The point of a fine iris repositor is next passed from the scleral opening right into the anterior chamber."[5]

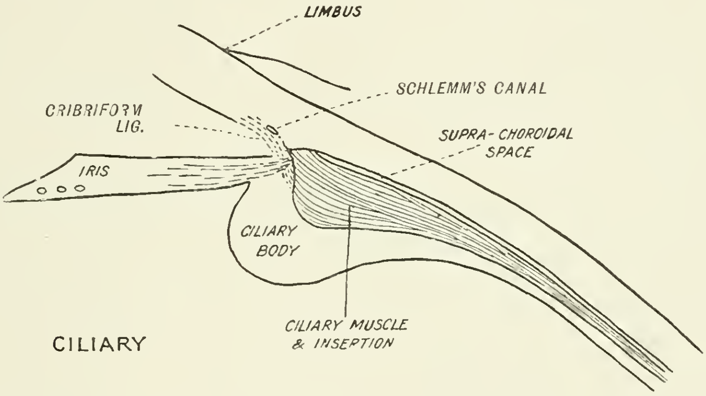
Mr. E. Treacher Collins, who was present when Dr. Fergus described his operation, said at the time: "Dr. Fergus clearly did two things (i) the removal of a small piece of sclera by trephining, (ii) the breaking through the pectinate ligament with a spatula—*i.e.*, a cyclo-dialysis."[6]

Dr. Fergus himself[7] at a later date, wrote: "Mr. Treacher Collins very properly said in the discussion at Belfast that my operation was not merely a trephining, but was also a cyclo-dialysis. I have combined the trephining with cyclo-dialysis since the month of March, 1909, I do not remember to have performed a simple trephining since that date."

Dr. A. J. Ballantyne, a colleague of Dr. Fergus in Glasgow, who, one presumes, has seen the operation frequently performed by its originator, writes in a very able and a comprehensive review of the subject[8] "cyclo-dialysis has again appeared as an integral part of Fergus's sclerectomy with the trephine. A conjunctival flap is dissected up towards the cornea, and laid over the corneal surface, while, with the trephine, a small disc is removed *a millimetre or two from the apparent corneal margin.* At first, the operation was completed at this stage by replacing the conjunctival flap, but Fergus soon introduced a modification *which now forms an essential part of this operation*, namely, the passage of an iris repositor from the trephine hole into the anterior chamber, *keeping it in close contact with the sclera and cornea.* The conjunctiva is then replaced and stitched in position." (The italics are mine.)

Fuchs[9], in defining cyclo-dialysis says : "In this operation, a blunt instrument, introduced through an incision made in the sclera *several millimetres behind the cornea*, is worked forward so as to detach a portion of the ciliary body from its insertion." This definition squares with one's preconceived ideas of what is meant by cyclo-dialysis ; also, with what the word itself implies. The aim of the procedure is to open up a communication between the anterior chamber and the supra-choroidal lymph space by separating the attachment of the ciliary body over a limited area.

Some anatomical considerations will now be adduced, mainly derived from the recent work of Dr. Thomson Henderson[10], the value and accuracy of whose anatomical observations have not, so far as we are aware, been controverted. These throw some light on the question of cyclo-dialysis. By the term cribriform ligament is meant the structure usually known as the pectinate ligament.



"In the region of the corneo-sclera are a large number of fibres running in a circular direction, of which the most prominent collection lies just posterior to Schlemm's canal, where it has received the name of the scleral ring. This particular aggregation of fibres is of great importance in keeping the ciliary muscle in position (p. 24). The scleral ring itself is not, however, as has been described, the point of attachment of the ciliary muscle, but it merely acts as a fixed point which steadies the cribriform ligament during action of the muscle (p. 28).

"The loose connective-tissue stroma of the iris root is attached to the fibres of the ligament at a point just posterior to the scleral ring. The ciliary body proper is thus excluded from taking any part whatever in the formation of the angle of the anterior chamber, which is a true angle, the outer boundary being formed by the cribriform ligament and the inner by the anterior surface of the iris root, while its apex is formed by the junction of these two" (p. 26).

A reference to the figure, which is adapted from Henderson's work on *Glaucoma*, will illustrate some of the above points. The attachment of the ciliary body at a point behind the scleral ring, and its association with the stroma of the iris root are shown. The figure also shows the supra-choroidal space converted from a potential to an actual one. "The supra-choroidal lymph space is regarded as being closed anteriorly by the attachment of the ciliary body to the sclera" (p. 29). To effect a cyclo-dialysis, these connections must be divided.

Now it is clear from the foregoing that, to perform a cyclo-dialysis from without, some part at least of the trephine hole must lie behind the attachment of the ciliary body, which, as we have seen, lies behind the plane of the filtration angle and the stroma of the iris root; unless, indeed, one passes the repositor backwards in the direction of the ora serrata. But this, from his own description, Fergus obviously does not do. Fergus himself says that he places his trephine hole "as near as possible" to the cornea. Ballantyne says a disc is removed "a millimetre or two from the apparent corneal margin." One presumes that the trephine used is not larger than 2 millimetres in diameter.

In the absence of more precise information, we are driven on to the horns of a dilemma. Either the posterior margin of the trephine hole is placed behind the attachment of the ciliary body, posterior to the plane of the angle of the anterior chamber; or else, if not so placed, we must assume that the repositor does not effect that cyclo-dialysis "which is an essential feature of the Fergus operation." In the latter contingency, one may surmise that in some cases of chronic glaucoma, an adherent iris may be detached or perforated by the iris repositor, and the posterior chamber be thus entered.

The Fergus operation is stated above to be merely a modification of that of Lagrange, whose aim is, while making his incision, "to sever the scleral insertion of the ciliary muscle"[11]—in effect, a cyclo-dialysis: this, in addition, to his sclerectomy. To do this, he necessarily makes a very peripheral incision

It is obvious, then, from what has gone before that the Fergus operation of trephining has, in common with all the old operations for the relief of glaucoma, from von Graefe's classical iridectomy down to Lagrange's and Herbert's latest procedures, the essential feature of a very peripheral opening into the anterior chamber. Lagrange and Fergus go further, and apparently make the opening behind or over the ciliary body—a necessity, if interference with that organ or its insertion be deemed desirable.

The question that now arises is whether this is sound practice. Parsons states[12] that "the lymph which passes along this (supra-choroidal) route is small in quantity, and is derived solely from the choroid and the ciliary body, involving only the internal economy of these structures, and having nothing to do with the maintenance of the intra-ocular pressures."

Fuchs, at the Belfast meeting[13], said that "he had tried trephining further away from the cornea. He had tried cyclo-dialysis in several cases, but he had recently given it up, as he had found that the symptoms recurred, and pathological examination had shown that in the places where the cyclo-dialysis was performed the tissues were more cicatrised, and that no permanent communication between the anterior chamber and the peri-choroidal space had been obtained."

One does not raise what Dr. Fergus has called "the bogey of the ciliary body"[14] from the side of septic or sympathetic dangers, but rather from that of increased liability to vitreous accident and to hæmorrhage from the engorged ciliary vessels, points strongly brought out by Elliot in his original communication.[15]. Both these occurrences are likely, in the writer's experience, to nullify the effect of the most carefully planned operation. And one feels sure that in less skilled hands than those of Dr. Fergus both these accidents must not infrequently happen, and in many cases inevitably. This is, and ever has been, the danger of all former glaucoma operations.

Now the one notable advance of recent times which really breaks fresh ground in the operative treatment of this disease has been made by Elliot, who has insisted that it is not only desirable in the interests of safety to open the tunics of the eye as far as possible in front of the ciliary region, but has devised a *technique* whereby a fistula may be obtained so far forward as to be semi-corneal in position. Furthermore, he has shown that it is possible to obtain permanent and satisfactory filtration by so doing. This insistence on a semi-corneal opening as an essential feature of the procedure, at once places Elliot's trephine operation in a class of its own.

Colonel Elliot has described his method in detail, as before stated, in the *Transactions* of the Ophthalmological Society[2] and in THE OPHTHALMOSCOPE[3], to which those interested are referred. Only a few points therefore will be alluded to here.

It is essential that a portion of the trephined disc shall consist of clear corneal tissue—from one-fourth to three-fourths of its area. The site is exposed by stripping the conjunctiva by short snips with the scissors, not only up to the limbus, but sometimes from one to two millimetres beyond it. The conjunctival layer of the cornea, continuous with the bulbar conjunctiva, appears to strip along its natural plane of cleavage. The distance that this can be done without button-holing the flap needs to be seen to be believed.

The iris is dealt with only if it prolapses into the hole on the completion of trephining. This it appears to do in about 50 per cent. of cases. A button-hole iridectomy is made by snipping with fine scissors *in situ*. This is to prevent blocking of the wound, and for no other reason. Further experience may show that such an iridectomy is desirable in a majority of cases. The uveal tract, with this exception, is left severely alone.

In performing the operation of trephining for glaucoma, one must decide definitely whether to adopt Fergus's procedure of trephining and cyclo-dialysis, with all that the latter implies, or Elliot's kerato-sclerectomy. The two operations must not be confused merely because the same instrument is used in the initial stage of both.

The writer visited Madras with a prejudice in favour of a modified Lagrange's operation, *i.e.*, an iridectomy, plus a sclerectomy with scissors, having performed this with success in a number of cases. He now feels convinced that trephining, if carried out on the above lines, is the simplest and safest method of obtaining an effective fistulisation of the anterior chamber.

In this connection, the conclusions reached by Weekers and Heuvelmans, of Liège,[16] are interesting.—They performed an experimental subconjunctival fistulisation of the anterior chamber in rabbits, and found that after five months, the tract was patent, microscopically as well as clinically. They summarised as follows :—"(i) The whole thickness of the sclera is to be excised, if a permanent fistula is to be obtained. (ii) For several reasons the incision must be made as close to the cornea as possible. When the sclerectomy is made too far from the limbus, the loss of substance in the sclera may be obstructed by the ciliary body, which may prolapse." Their conclusions thus support Elliot's main contentions.

That fistulisation of the anterior chamber, which has every appearance of permanence, is demonstrable clinically at least twelve months after operation, the writer has satisfied himself by ocular evidence in Madras. And, since iridectomy is not eminently satisfactory in a large class of glaucomas, if the dictum at the head of this paper be accepted as axiomatic, Elliot's operation of kerato-sclerectomy with the trephine seems likely to become the operation of the future.

REFERENCES.

1. **Holth.**—The Ophthalmoscope, November, 1909, p. 781.
2. **Elliot.**—*Transactions of the Ophthalmological Society*, Vol. XXXI, 1911.
3. **Elliot.**—*British Medical Journal*, November 4th, 1911, p. 1160.
4. **Stephenson, Sydney,**—The Ophthalmoscope, February, 1910, p. 99.
5. **Fergus.**—*Ibid.*, February, 1910, p. 75.
6. **Collins.**—*British Medical Journal*, October 2nd, 1909, p. 984.
7. **Fergus.**—The Ophthalmoscope, February, 1910, p. 75.
8. **Ballantyne.** *Ibid.*, July, 1910, p. 515.
9. **Fuchs**—"Diseases of the Eye," Third edition, p. 425.
10. **Henderson, Thomson**—"Glaucoma."
11. **Lagrange.**—Quoted in The Ophthalmoscope, July, 1910, p. 511.
12. **Parsons.**—"Pathology of the Eye," p. 995.
13. **Fuchs.**—*British Medical Journal*, October 2nd, 1909, p. 984.
14. **Fergus.**—The Ophthalmoscope, February, 1910, p. 76.
15. **Elliot**—*Ibid.*, December, 1909, p. 806.
16. **Weekers.**—Quoted in The Ophthalmoscope, March, 1910, p. 225.

CLINICAL NOTES ON A CASE OF GLAUCOMA COVERING A PERIOD OF THIRTY-SEVEN YEARS.

BY

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E—— H——, a female, aged 22 years, came to Hospital (Old Moorfields) on February 18th, 1875, with the following history.—A little over twelve months before, her sight began to fail. Six months before, she had severe "inflammation" in the left eye.

On examination: left cornea was found to be hazy, pupil small, iris discoloured, T. +. Vision 6/60 and J. 4 imperfectly, almost total posterior synechiæ. R.V. = 6/6 and J. 1.

Diagnosis: effects of kerato-iritis (left).

Left iridectomy was performed, and patient was discharged on February 25th, 1875. On July 8th, atropine both. No further note

On March 6th, 1876, the following note was made.—No trouble with the left eye since the operation Iris tolerably clean; well-marked, good iridectomy upwards; T. more than right; some ciliary injection.

Noticed sight of right eye failing for one month, but no pain, although there is a little pain this morning.

R.V. = 6/12 and J. 2 (not well) at 7". L.V. = 6/0 and J. 10 very imperfectly, and only when the page is very much slanted away from the eye, downwards and outwards.

Fundi, Left: floating bodies in the vitreous; disc red, but no "pitting" (*i.e.*, cupping). *Right*: fine floating bodies in vitreous and fine dots in lens; fundus and disc red, but good view of fundus not obtainable.

The artificial leech was used, and arsenic (Fowler's solution) and calumba were given internally.

On March 20th, 1876, following note: R.T.+? V. = $\frac{6}{12}$ and J. 2 (imperf.) at seven inches. L. V. = J. 14 imperfectly. The eyes, upon the whole, are not quite so well; both irides cloudy; long sclerotic vessels course over the eyeball. *Fundi* R. and L. discs just visible; no details can be made out. Right ridectomy upwards, and left sclerotomy performed.

March 27th, 1876, discharged from Hospital.

April 3rd, 1876, better; has not had any pain in the left till yesterday; now it feels "strange"; does not feel like the right; no pain in the right eye; R. T. normal; L. T. + ; slight bulging of choroid at the extremities of the incision for the sclerotomy.

After this the patient kept fairly well, attended Hospital at regular intervals, and the final note on March 3rd, 1879, was as follows :—

R.V.=6/12 and J. 1. L.V.=6/60 and J. 8. R. and L. T. normal. From this date there is no record of her attendance at hospital up till January, 1905, when she again attended.

On January 19th, 1905 it was noted: eyes misty sometimes; last two months headaches; cannot see in the distance. R.V.=6/36. L.V.=1/60.

On January 9th, 1905, the case was investigated more thoroughly: R.V.=6/60 c.−3 sph. c.−1·5 cyl. $\diagdown_{60^\circ}$ =6/9 and J. 1. L.V.=4/60 c.—1 sph. =6/24 not further improved: J. 20 not improved by glasses. R.T. + 1, no cupping of disc; venous pulsation. L.T. full; left disc paler than right; arteries very small; sees halos when out at night; sight goes misty at times, and then has pain. The fields showed slight general contraction, left rather more contracted than right. She was put on eserin gr. ij. ad i℥, *t.d.*

On January 23rd, 1905, it was noted: No "rings," sees better, no mist. R. T. + 1: L. T.n. To use massage, and continue eserin drops. She was also noted for admission, but does not appear to have come into hospital.

On February 6th, 1905, the note was: Pain in the R. eye better. R. V. 6/36 c. − 3 D sph. = 6/6 (1). L. V. 1/60. No improvement with glasses. To continue eserin.

On February 13th, 1905, she was ordered −3 D. spheres R. and L. for distance only.

By May 1905, the tension was noted as normal in each eye. Since then, she has attended hospital at regular intervals of a few months, the tension has varied, sometimes going up slightly, but this has always been checked by eserin. Vision in the right eye has kept up remarkably well, the last note being as follows: January 4th, 1912, R. eye keeping very well. R. V. = 6/24 dimly c. − 3 sph. = 6/9. L. V. = fingers at 1 m.; not improved. Near vision was not recorded on that date, but was J. 1. (right eye) when last taken a few months before. Being now myopic, she does not require a glass for reading or close work. R. anterior chamber rather shallower than left. Very clean coloboma; media clear; disc *very* slightly cupped; eye "full" but T.n. L. anterior chamber deeper than right; coloboma not so clean; some shreds; media rather hazy; vitreous a little turbid: disc a little cupped: fundus seen dimly; eye full; cystoid cicatrix to outer side, but there does not appear to be any leakage, as it is adherent, and there is no subconjunctival œdema when tested with a probe. No halos or lights seen; is kept on eserin.

Remarks.

This case is interesting, and is, I think, worthy of record for several reasons :—

1. The length of time during which the case has been under observation: nearly 37 years.

2 Complete recovery of right eye, notwithstanding some tendency to relapse about seven years ago.

The eye kept perfectly well for some fifteen years after original attack; is quite well now and gives no trouble.

3. The left eye, which has a marked cystoid cicatrix, has done badly and has very little vision; whereas the other eye, which shows a perfect iridectomy, without any trace of cystoid cicatrix or leakage, has recovered perfectly, this being contrary to the experience of many modern ophthalmic surgeons, it being often stated that bad iridectomies give better results than surgically perfect operations.

I am indebted to Mr. Claud Worth, to whose clinic the patient now belongs, for permission to publish this case.

AN OPERATION FOR GLAUCOMA.

(A Preliminary Note.)

BY

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THE fault common to most of the operations which have recently been introduced for the production of a filtration cicatrix in glaucoma is that in the course of time the wound heals firmly, and filtration through the cicatrix ceases, and the tension of the eye rises again. This is not an invariable rule, since in some of the cases permanent cystoid scars are formed. The failure to form permanent filtration scars is probably due to new fibrous tissue filling in the opening into the globe, and becoming lined on its inner surface by endothelium, and so preventing the escape of the fluid from the anterior chamber into the lymphatics of the subconjunctival tissue.

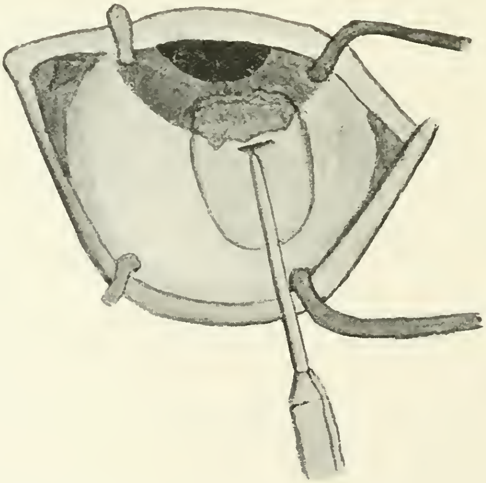

FIG. 1.—Showing the position and method of making the incision in the sclera.

Handley has shown, in cases of lymphatic and venous obstruction, that the fluid can be drained away by the insertion of silk threads carried subcutaneously and left *in situ* from the region of lymphatic obstruction to a position whence there is a good lymph flow.

In the following cases of glaucoma I have by this means drained the anterior chamber into the subconjunctival tissue, with a successful result in all the cases, both with regard to the relief of tension and the formation of a definite cystoid cicatrix, which seems, as far as can be told at present, to be permanent

The method of procedure is as follows :—

Incision.

After the instillation of adrenaline, cocaine, and eserine, a very large and thick conjunctival flap is turned forwards over the cornea and dissected up to the limbus. Great care must be taken not to buttonhole the flap in the neighbourhood of the limbus. For this reason the flap should be dissected off the sclerotic as closely as possible, and the limbus should not be approached too closely, as the conjunctiva is thinner in that position. With a short Graefe knife, an incision, about 3 mm. long, is made from the outside into the anterior chamber, by gradually cutting through the fibres of the sclerotic with the knife point (Figure 1). The incision should start about 2 mm. behind the limbus, and be sloped forward, so that the anterior chamber is opened at its periphery. It is easy to tell when the chamber has been opened by the loss of resistance to the knife point or by inserting an iris spatula, which will allow a drop of aqueous to present.

Insertion of the silk drain.

A piece of black silk thread*, 5 mm. long, having a knot at one end, is carefully sterilised, and with a pair of forceps is laid across the incision in the sclera. With a narrow iris spatula, having a rounded notch in the end, the silk is tucked into the incision (Figure 2). As the silk is pushed forward into the anterior chamber, the knot sticks in the lips of the wound, whilst the free end passes forward into the angle of the anterior chamber. The conjunctival flap is then replaced in position, a stitch being inserted if necessary (Figure 3). The whole operation can be performed without emptying the anterior chamber, and is quite easy to execute.

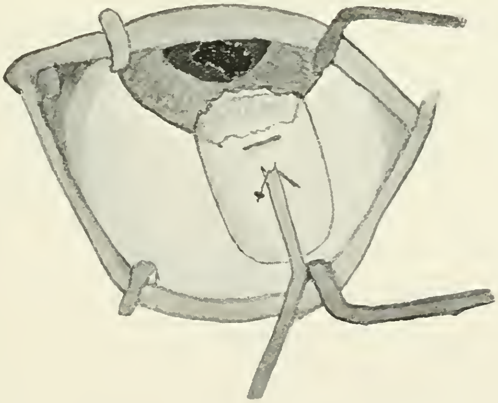

FIG. 2 —Showing the method of insertion of the silk drain.

The wound in the conjunctiva after forty-eight hours is usually firmly healed, and the subconjunctival tissue is filled with fluid. At first, this usually extends beyond the area of the conjunctival flap, but after a time, it becomes more localised. The tension of the eye is usually subnormal from four days to a week, after which time it regains its normal tension. In none of the cases was there any iritis or undue reaction; the only *contretemps* was in one case, where there was a small prolapse of the iris at the time of operation—this was probably due to the fact that eserine had not been previously instilled, and that the incision was made rather larger than usual.

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* The thread used was of twisted silk of a size known as 00.

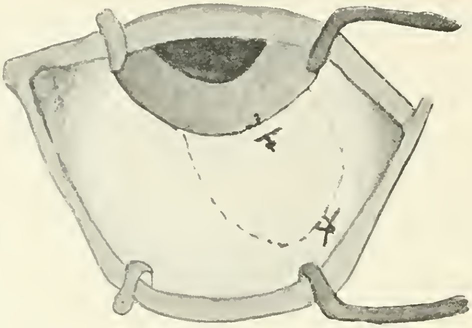

FIG. 3.—The silk drain in position. The conjunctival flap is also replaced and sutured.

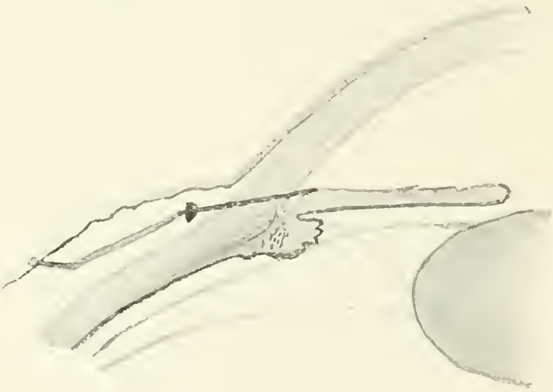

FIG. 4.—Diagrammatic section showing the position of the thread.

The first case was operated on fifteen months ago, and remains well up to the present time.

The obvious danger in the operation is sepsis. The utmost care must be used to avoid it. The conjunctival sac should be bacteriologically examined, and cleansed four or five times a day with boric lotion for three days before operation. After turning back the conjunctival flap, the same instruments should not be used to touch the thread, and the latter should not touch the conjunctiva. A thick and extensive covering of conjunctiva should be made, so that the knot is well buried.

Cases.

The following are abstracts of the notes of the cases:—

1.—*Painful blind glaucomatous eye.*—F. J. Female, aged 55. A stout woman, the subject of chronic bronchitis. Admitted to the Central London Ophthalmic Hospital, 20th October, 1910.

Left eye.—Acute attack of glaucoma four months previously. Recurrent attacks of pain. Pupil semi-dilated. Shallow anterior chamber. No P. L. Deep cupping of the optic disc.

October 21st, 1910.—Thread operation performed. The thread could be seen in the anterior chamber subsequently to the operation. There was considerable chemosis, lasting for about a week after the operation. The tension of the eye was higher than normal for a few days during the second week after the operation, after which it became normal. Since that time the patient has had no return of pain and the tension is normal. A good cystoid scar formed and has remained.

The right eye subsequently became glaucomatous, and the tension was relieved by iridectomy.

2.—*Subacute glaucoma.*—J. Q. Female, aged 52 years. Two months previous to admission into the Central London Ophthalmic Hospital, on February 8th, 1912, the patient had an acute attack of glaucoma in the right eye, with vomiting. This subsided under eserine, the eye remaining hard.

When first seen T.+1. Cornea hazy. Shallow anterior chamber. The iris did not react well to light and was drawn upwards. The fundus showed some cupping of the disc and old choroiditis. V.=shadows.

February 8th, 1912.—Thread operation. Silk seen in the anterior chamber subsequent to the operation. The corneal haze had disappeared on the following day. For about a week following the operation, considerable chemosis, which subsequently became localised to the neighbourhood of the wound, a large definite cystoid scar forming. The tension has remained down since the operation, and the vision at the present time is 6/60.

3.—*Chronic glaucoma.*—F. M. Female, aged 35 years. Admitted to Central London Ophthalmic Hospital, February 3rd, 1912. Noticed the sight of the right eye failing seven months with rainbows round the light. Attacks of misty vision usually came on in the afternoon. At the time of her admission she had one of the worst attacks she had experienced. T.+2. Cornea slightly steamy below. Shallow anterior chamber. Disc deeply cupped. Vision=6/12. Field markedly contracted to about 30° circle. Left vision=6/6. T. full. Under eserine the tension came down to T.+1.

March 7th, 1912.—Thread operation. Much chemosis followed, which subsequently became localised to the neighbourhood of the scleral wound The tension for the first few days remained low, but had returned to normal at the end of the first week.*

4.—*Chronic glaucoma.*—W. P. Male, aged 36 years. Left eye had cyclodialysis performed for chronic glaucoma in March, 1909. Rainbows were seen by the patient two months after the operation, but his vision did not get any worse until three months previous to admission on February 13th, 1912, since which time the field had become contracted and the vision had dropped from 6/12 to 6/36. There was a deep cup of the optic disc, and some old choroidal trouble in the fundus. The anterior chamber was shallow. Tension full.

February 15th, 1912.—Thread operation performed. There was a small prolapse of iris, which was removed. After the operation there was considerable chemosis, and the eye remained soft for two weeks. Subsequently, a large cystoid scar formed. Tension normal. V.=$\frac{6}{15}$.

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*In this case the tension returned after about three weeks but was relieved by a similar operation. This was probably due to the fact that a very fine thread was used, and the end did not reach into the anterior chamber, as it could not be seen subsequently to the operation.

THE REDUCTION OF TENSION IN CHRONIC GLAUCOMA.

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WHEN acting as Chief Clinical Assistant in the Ophthalmic Department at Guy's Hospital, London, in the summer of 1910, under Mr. A. W. Ormond, I made the suggestion that it might be possible to drain glaucomatous eyes by means of silk, on the principle of Sampson Handley's work.

The matter was not pursued clinically, but I was so impressed with its feasibility that I practised passing a silk thread into the anterior chamber of excised ox eyes. I satisfied myself that it was possible to establish a communication between the chamber and the subconjunctival space in this way. The actual procedure I practised was to pass a threaded curved needle directly through the cornea into the anterior chamber. The point was then made to pierce the angle of the chamber, and was brought out into the subconjunctival space. It was made to run in this for a few millimetres, and then brought to the surface. The silk was drawn on until the tail end passed through the puncture in the cornea and lay free in the chamber. The silk was then cut flush with the conjunctiva, and a little manipulation covered this end also. A reference to Figure 1 will simplify the description.

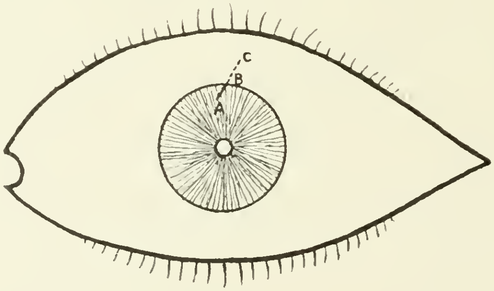

FIG. 1.—*A*. Puncture in cornea, point of entry of needle. *B* marks its point of exit from the anterior chamber, and *C* the point in the conjunctiva where it was brought to the surface. From *A* to *B* the silk can be seen distinctly in the chamber; from *B* to *C* it lies under the conjunctiva.

I was appointed Honorary Surgeon to the Free Eye Hospital, Southampton, in June, 1911, when, for the first time, I was able to carry out my procedure on the human subject. In the meantime, I had slightly varied the procedure, and my first patient, operated on on July 6th, underwent the following process (*vide* Fig. 2).

The eye was anæsthetised with cocaine and adrenalin, and eserine was instilled to contract the pupil. After thorough *lavage*, a curved needle, threaded with No. 2 silk, was inserted into a fold of bulbar conjunctiva at A. The point of the needle was pushed subconjunctivally into the chamber through the angle at B. It was made to leave the chamber at C, run subconjunctivally for a few millimetres; and brought out at D. A and D were each about four or five millimetres from the corneal margin. The silk was then drawn through and cut flush at A and D. By stroking the conjunctiva folds at these parts the ends of the silk were completely buried. This patien was exhibited at the Ophthalmological Society on March 14th last.

I did this operation on six eyes, but found that there were two drawbacks—first, a risk of pricking the iris and lens, and, secondly, the conjunctiva was very frequently torn by the fixation forceps, for it is surprising what an amount of force is necessary to pass a needle as described above. The tearing of the conjunctiva necessitated withdrawal of the silk, as an open path for infection was left. Also, on one or two occasions, instead of the silk passing direct into the subconjunctival space, I found that it ran for a millimetre or two in the substance of the conjunctiva and cut out at a later date.

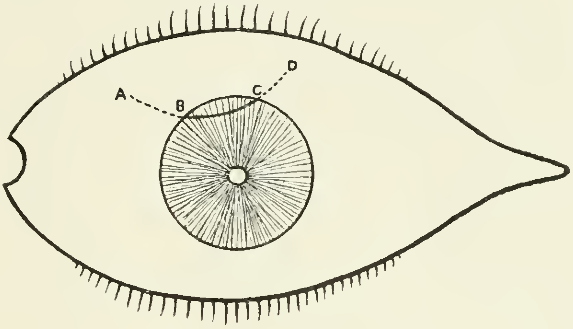

FIG. 2.—*A*. Point of entry of needle into sub-conjunctival space. *B*. Point of entry of needle into anterior chamber. *C*. Point of exit of needle from anterior chamber. *D* Point of exit of needle from sub-conjunctival space. The silk left in extends from *A* to *D*. It lies in the sub-conjunctival space from *A* to *B* and from *C* to *D*. From *B* to *C* it lies in the anterior chamber, in front of iris.

In discussing the matter with Mr. J. F. Bullar, Consulting Surgeon to the Free Eye Hospital, Southampton, he suggested the following procedure, which I practise now :—

The eye is cocained and cleansed in the usual way, eserine being used to contract the pupil. A large flap of conjunctiva is then raised off the globe, a crescentic attachment at the limbus being left. For choice, the flap should be taken from the upper part which is generally covered by the lid—*vide* Fig. 3. The whole thickness of the conjunctiva is taken, and as the limbus is neared, the conjunctiva here being thin, great care is taken not to make a

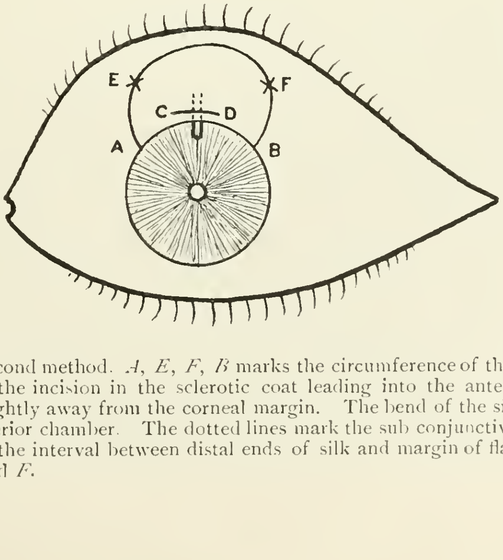

FIG. 3.—Second method. *A*, *E*, *F*, *B* marks the circumference of the conjunctival flap. *C D* is the incision in the sclerotic coat leading into the anterior chamber. Notice it is slightly away from the corneal margin. The bend of the silk (thick line) lies in the anterior chamber. The dotted lines mark the sub conjunctival part of the silk. Notice the interval between distal ends of silk and margin of flap. Stitches in flap at *E* and *F*.

"button hole." The flap is then reflected on to the cornea, and the globe being steadied by fixation forceps at the opposite side, an incision is made with a keratome into the anterior chamber.

The incision is about 3 millimetres long, and begins about 2 mm. from the corneal margin, and is, of course, through that part of the sclerotic which is exposed by raising the flap of conjunctiva. (In making this incision it is usually necessary to remove the flap of conjunctiva out of the line of vision, so that the operator can see that the point of his knife is just anterior to the iris. To do this, either the globe may be steadied by grasping the flap itself at its base and holding it vertically upwards, or the globe may be steadied in the usual way, whilst an assistant lightly holds the flap up.)

The incision being made, the knife is withdrawn, and, of course, there is no loss of aqueous. A small piece of sterile silk, not more than half an inch long, is doubled on itself and the bend placed against the lips of the wound in the sclera, the rest of the silk lying on the exposed sclera. A little delicacy is here needed to push the bend of the silk through the incision into the chamber. I generally do it with an ordinary repositor. There is immediate escape of aqueous – indeed, one or two attempts are generally necessary before the silk slides in. As soon as the bend can be seen in the chamber, the flap of conjunctiva is replaced, thus covering the distal portions of the silk. Great care is taken at this stage to see that the ends of the silk are well away from the margin of the conjunctival flap—it sometimes being necessary to cut off a small piece from each end. The flap is then stitched in a couple of places, and the operation is complete. As far as I can judge, there is no manipulative risk in doing this operation. Prolapse of the iris has not occurred, and I hardly think it can. I have done this operation on four eyes only up to the present, but it is, in my opinion, much the better of the two.

The after-treatment is very simple. The eye is bandaged for a couple of days, but the patient is up and about on the day after the operation. There is very free drainage for the first few days—the chamber being abolished and the conjunctiva rendered very œdematous by the aqueous. Within a week the chamber is re-established, and the conjunctival condition improves rapidly. I expose the eye on about the third day as a rule. The conjunctival stitches are removed at the end of the week. I was able to show a case at the March meeting of the Ophthalmological Society. The patient had had both eyes operated on; the second operation having been performed only ten days previously.

Up to the present I have operated on ten eyes in seven persons. I add in an appendix just the briefest notes of the cases. Considering the very short time that has elapsed since I performed the first operation, it would be premature to accept the results as permanent. The points that I claim to have established are that: (1) the silk can be tolerated without any trouble; (2) drainage is efficient. Time only can show the permanency or otherwise of these results. It must be patent that any judgment on the value of the operation cannot be offered at this stage. I am giving it a trial, and I hope that other surgeons will do likewise. From theoretical considerations alone it holds out good promise of keeping the tension permanently moderate. So far, practice has confirmed this. When I have added that the operation is very simple to perform, I have made all the claims that it is entitled to at this stage. The notes in the appendix are, to say the least, bald, and they are purposely so. Any notes can but be expressions of my own opinion, and, therefore, biassed. Personally, I am satisfied with the results, and shall continue to perform the operation. For the satisfaction of surgeons who desire to know more about the cases, I am happy to say that the majority of the patients are available for inspection on the shortest notice.

Case No.	Date of Operation.	Eye operated on.	Remarks.
1. G. S.	July 6th, 1911	R.	Silk inserted by first (needle) method. No trouble of any kind when last seen, March 15th. Tension natural.
2. W. T.	Aug. 21st, 1911	R.	(First method.) Conjunctiva torn at the operation. Two days later as silk was still uncovered, it was withdrawn. No trouble followed.
	Aug. 30th, 1911	L.	The needle was passed into anterior chamber, directly through cornea, and was brought out sub-conjunctivally. When patient left the hospital. 14 days later, there was no trouble. He has not presented himself since.
3. W. S.	Sept. 13th, 1911	L.	(First method.) Conjunctiva torn at operation. Silk had to be withdrawn a few days later. Tension not recurred, so nothing more done.
4 C. F.	Oct. 24th, 1911	R.	(First method.) Silk ran in substance of conjunctiva for a few mm. About three weeks later it came to the surface. The end was cut flush with conjunctiva, but latter would not heal over it, so it was withdrawn. Tension has not recurred.
	Dec. 7th, 1911	L.	(Second method.) No trouble. Silk retained. Tension is natural.
5. R. H.	Nov. 8th, 1911	R.	(First method.) No trouble. Silk just transfixes margin of anterior chamber. Tension natural.
6 R. P.	Nov. 9th, 1911	L.	(First method.) This case had iridectomy performed some time back. Tension had recurred. Silk was inserted, but ran in the substance of the conjunctiva and cut its way out weeks later. He presented himself with a red angry-looking eye. Silk was withdrawn and eye became quiet. Came up frequently for examination. Tension increased steadily, so on January 1st, 1912, a piece of silk was inserted by the *second method*. Owing to the presence of the coloboma, it had to be passed in at the outer side of the cornea. The constant movement of the lids over the distal ends of the silk caused the latter to become exposed. A small incision was made through the conjunctiva and the ends of the silk were cut still shorter. The conjunctiva was then sewn and has remained sound. Tension natural.
7. G. F.	Feb. 15th, 1912	R.	(Second method.) Silk retained. No trouble. Tension natural.
	Mar. 4th, 1912	L.	(Second method.) Silk retained. No trouble. Tension natural.

7, Carlton Crescent,
Southampton.

CLINICAL MEMORANDA.

A SEVERE CASE OF BUPHTHALMOS RELIEVED BY OPERATION.

BY

P. H. Adams, F.R.C.S., D.O.(Oxon).
SURGEON TO THE OXFORD EYE HOSPITAL.

This patient was sent to me by my friend Dr. T. E. Pemberton, of Buckingham, who has kindly furnished me with his notes of the case from birth until the time I saw the baby when four months old. Dr. Pemberton's notes follow :

"I attended the mother at her confinement, a perfectly normal labour with no complications and no instrumental delivery. It was about a week after the birth of the child that the mother called my attention to the eyes, as she thought that they were not right. I found the eyes were very large and prominent. In neither eye was it possible to see the iris or the pupil, both corneæ appearing as if covered by a bluish-grey film, and apparently there was total blindness. There was no conjunctival injection at this time."

"Soon after this a rather suspicious rash appeared on the buttocks, and from certain facts in the family history, I suspected congenital syphilis, and started treatment with mercurial inunction. As, however, no improvement occurred and the eyes became injected, I sent her up to see Mr. Adams at the Oxford Eye Hospital."

"The father and mother of the child are both healthy, and have two children older than the patient alive and healthy, and the mother has had no miscarriages, but there is a possibility of the father having inherited or acquired syphilis from his parents."

I (P.H.A.) first saw the child when she was about four months old. There was then well-marked buphthalmos in both eyes, although the left eye was considerably the worse of the two. Both corneæ were very steamy, the anterior chambers deep, and the pupils small and apparently irregular. The tension, as far as one could ascertain it, was R.E. + ½ and L.E. + 1, and there were, apparently, large vessels running over the irides. I concluded, therefore, that the glaucoma was in this case probably secondary to an intra-uterine inflammation, but as dilating the pupils increased the tension, I ordered eserine twice a day to both eyes. At this time the child would follow a light with her eyes. After three weeks, the right eye was a little brighter, the left eye as bad as ever, and so the child was taken into the Hospital, and the left eye was operated on. Under the chloroform, it was not possible to clear the upper margin of the cornea on account of the large size of the eye, so I turned up a conjunctival flap from below, exposing the lower margin of the cornea, and trephined here, using a Fergus 2 mm. trephine. The iris seemed very inelastic and difficult to pick up with forceps, so I inserted a Tyrrell's hook, and pulled it out and removed a large piece. The eye quieted down quickly, and a fortnight later, I did the same operation on the right eye, with the exception that I did only a peripheral iridectomy, using the iridectomy forceps with no difficulty. This eye also quieted down very quickly, the cornea keeping perfectly bright, and the tension normal. The left eye, however, had got rather hard again, and the cornea a little steamy, and, as this persisted, the child came into hospital again, and I performed a Herbert's flap operation on the outer side, using the bent knife. After this the cornea brightened, but the tension was still rather higher in that eye than the other.

I saw the patient again the beginning of this year. The mother stated that the child saw very well with both eyes, as she had tried covering the right—the good eye—and still the child could see and take things. Both corneæ were quite bright, and one got a restricted view of the left fundus by the indirect method. The disc was cupped, but of a fair colour, and the cup was not so extensive as one might expect. No view was obtainable in the right eye, owing to the small pupil and the restlessness of the patient. Both eyes were myopic.

In the left eye there appeared to be a notch in the lens below, opposite the original trephine hole, due, I suppose, to some rupture of the suspensory ligament in this situation at the time of operation. Both eyes were quite quiet, with some raising of the conjunctiva over the sites of the operations. Tension of right eye, normal; of left eye, full normal.

Dr. Pemberton now writes that "I found the patient, now twenty-two months old, running about the cottage garden without help, looking well and healthy, and apparently seeing quite well. Also, if one holds up anything, however small, before her eyes, she will promptly take hold of it."

A DECOMPRESSION OPERATION FOR GLAUCOMA.

BY

GEORGE YOUNG, M.D., M.R.C.S., L.R.C.P.

ASSISTANT SURGEON TO THE NEW YORK EYE AND EAR INFIRMARY.

BECAUSE *repeated* sclerotomy often ends in a successful result in those cases where a correct iridectomy is no longer possible, I fancied some years ago that this final success might be due to formation of *two* points of leakage in the sclera. By making a far more accurate comparison of operated cases possible, the tonometer of Prof. Schiötz convinced me that there was at least some foundation for my belief. It needed but a proof. Selecting an eye with chronic glaucoma, where all light perception had become extinct, where neuralgic pains had become sufficiently distressing to warrant operative interference, and where *personal* myotic treatment, controlled by the tonometer, failed to lower the tension, I operated on January 20th, 1912, with the trephine and method of my own device. as described in the *Ophthalmic Record* of September, 1910. On the day of operation, the patient developed a smart subacute attack, the tension, which was always considerable, reaching almost 100 mm. Hg. This was measured *before introducing the speculum.* All I did was to remove *two discs of sclera,* sufficiently far from the limbus *to avoid the anterior chamber.* Operation and recovery were painless and uneventful, and although the uveal tract was nowhere pierced, or even touched, the first dressing after twenty-four hours showed the conjunctival flap suffused and the tension down. The anterior chamber was preserved throughout. The tension has remained down for one month now. On the tenth day it was 14 mm., while to-day it is 16 mm. Hg. The eye is quiet, looks normal, and all neuralgic pains have ceased. No myotic is used.

Seven days ago I repeated this operation on a case of buphthalmos with no perception of light, trephining a great deal further back in order to be sure to avoid the anterior chamber. Tonometric readings in this case were as follows: On February 4th =93 mm., and one hour after vigorous myotics, =77 mm. On February 12th, before the operation, =97 mm. On February 13th, twenty-four hours after the operation, =55 mm. On February 14th =37 mm., and to-day, February 19th =36 mm. Should the tension fail to reach physiological limits, I would not hesitate to make a third opening.*

Only one hour ago I listened attentively to the reading of a very thorough paper naming and describing all the operations so far performed on glaucoma. It gave me one more good reason to believe that it does not appear to have been surmised before that so simple a process might lead to so striking a result. As far as I am personally concerned, my notes, which I hope to be allowed to send you soon on my ideas and measurements, operative *technique*, and instruments I use, are original and self-developed, being worked out in the course of years with this idea constantly before me. The time seems ripe to test their true value. And, as from your excellent reports particularly, it appears more and more evident that in trephining may lie the ultimate solution of this baffling problem, I hope to stand by your ranks in real earnest and good fellowship.

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* On February 26th, the tension still being 40mm. Hg., I made a third opening. The tension dropped promptly. February 28th, it was 24mm. Hg. To-day, March 2nd, 25mm. Hg.

As this operation can be performed without risk in the highest degrees of tension, it is of advantage in saving eyes of good appearance from enucleation. To avoid stirring up these uveal tracts ever so little seems to me of still greater advantage. Yet what prompts me to undertake these tentative operations is the hope that the method, once proved successful, may by its very simplicity be applicable and advisable in checking the onslaught on vision, and that very much earlier, *i.e.*, as soon as the tonometer proves that myotics can no longer maintain physiological tension, and the Bjerrum test warns us that destruction is actually in the field. It seems to me that we could advise and even urge this operation at a time where we would hesitate even to think of performing another.

I am indebted to Dr. Wilbur B. Marple for the first case and for the use of an excellent tonometer which he placed at our disposal at the New York Eye and Ear Infirmary, and which I have used extensively since 1909 with invaluable results. To Dr. Colman W. Cutler my thanks for the opportunity of the case of buphthalmos at St. Luke's Hospital, and for his interest and some excellent suggestions in technical details which have proved of great value, and are to be mentioned hereafter. To our pathologist, Dr. George Sloan Dixon, and our curator, Mr. Edgar B. Burchell, for the liberal use of the Eno Laboratory and its many excellent specimens, as well as for their encouragement and help in making many useful investigations and experiments, and their aid in preparing a very handsome collection of specimens of glaucoma of my own.

784, Park Avenue,
New York,
19*th February*, 1912.

NOVELTIES.

A LOWER POWER BINOCULAR MAGNIFIER.

Carl Zeiss, of Jena, has produced a magnifier of new type, which permits the binocular observation of objects under moderate magnification without strain on the eyes. (Fig. 1). The instrument is well made, its optical conditions have been carefully considered, and it should prove of use to surgeons, nature students, mechanicians, and others who want to see the details of small objects distinctly. Hitherto, in instruments of the kind, a constant drawback has been that no attention has been paid to the conditions necessary to obtain a flat field of view, but in the present binocular magnifier the optical system is so adjusted that the axes of the optical image remain parallel to the corresponding axes in any plane of the object viewed, so that not only is a flat field obtained, but the normal relative position in depth of different parts of the object is preserved.

There is another detail of the instrument which is, we believe, entirely new in its application. If one arranges even low power lenses in front of the eyes, at a distance apart corresponding to the interpupillary distance, the eyes cannot cover the common part of the two fields of view without so great an effort of convergence as to make easy binocular sight impossible. This drawback is overcome by means of a pair of reflecting prisms, rhomboid in shape, so adjusted as to reduce sensibly the distance apart of the axes of the two optical systems, and in this way the common parts of the two fields of view are seen under a greatly reduced angle of convergence.

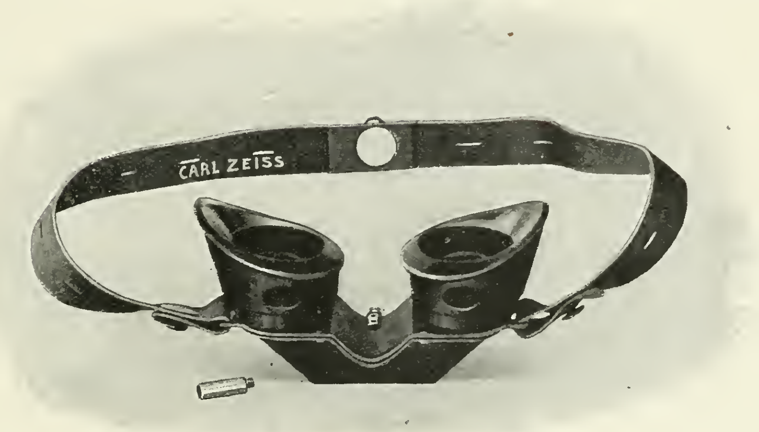


Fig. 1.
A Binocular Magnifier with Head Band—the socket which holds the illuminating apparatus is unscrewed.

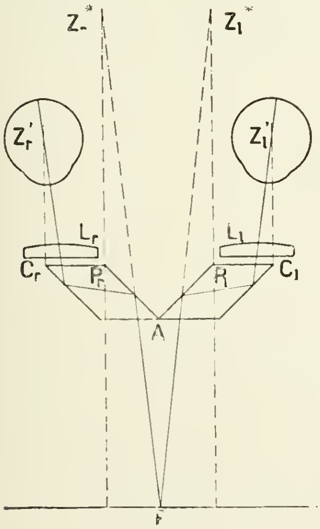


Fig. 2.
Diagrammatic representation of sight through the Binocular Magnifier.

L_r L_l are the two lenses.

P_r P_l the two reflecting prisms.

Z_r' Z_l' are centres of rotation of the two eyes.

Z_r^* Z_l^* indicate the apparent centres of rotation.

F indicates the position of the object.

The parallels drawn from Z_r^* to Z_l^* indicate the direction of the lens axes in the field of view.

With reference to the optical system, simple plano-convex lenses up to +12D. are sufficient for the low power magnification, and these can be changed for other power lenses in every instrument. In order to obtain the best visual conditions, the lenses should be so adjusted that the central visual lines traverse their respective lenses through the nodal point. Theoretically this would demand an arrangement for the adjustment of the width of the instrument; but such an adjustment would be complicated and costly, and the maker having convinced himself that adjustments of the interpupillary distance can be made without injury, so long as they do not exceed 1 mm. in extent for each eye, has met the problem by providing the instrument in four different widths, *viz.*, for interpupillary distances of 59 mm., 62 mm., 65 mm., and 68 mm., so that, even in the least favourable case, an eye is at most ·75 mm. outside the theoretically correct position.

Vulcanite cups protect the eye pieces, and with normal faces fit well round the eye sockets. They are provided with apertures; the upper ones for ventilating purposes, the lower ones serve also as peep-holes, to enable the wearer without difficulty to pick up an instrument, etc. Further, they are furnished with cells in which correcting glasses can be set, which, with astigmatic eyes, are especially desirable. The magnifier is arranged either with a head band or with a clasp which fixes on to a stand. A lighting apparatus consisting of a metal filament lamp with condensing lens, by means of which the visual field is illuminated, can be added to the instrument

Lenses give powers of ·75, 1, 2, 2½, and 3 times. The use of the low powers (·75, and 1) is indicated when it is desired to observe binocularly an object at a considerable distance, and especially when for any reason this is inconsistent with the normal converging angle of the two eyes; in this case it is only by such means as the magnifier affords that the reduction of the visual angle of convergence can be effected. The case applies, for example in examining the throat binocularly with a throat mirror.

The relation between the magnifying power of the instrument, the distance of the object, and the binocular field of view is shown in the following table:

Magnifying Power	Distance in cm.	Field in cm.
3	5	2·5 x 3·5
2·5	7	3 x 4·5
2	9	4 x 6
1	22	7 x 11
·75	30	10 x 14

The instrument may be seen and tested at Messrs. C. W. Dixey & Son's, 3, New Bond Street, or 20, Welbeck Street, W.

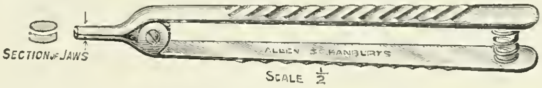
A NEW OPHTHALMIC NEEDLE-HOLDER.

BY

ALFRED C. NORMAN, M.D.Edin.
SUNDERLAND.

Most of the ophthalmic needle-holders at present in use depend upon some form of spring catch to keep the needle in place, and with this type of instrument trouble often arises during an operation owing to the catch becoming jammed. When this happens the needle cannot be released without the application of considerable force, and it is sometimes a difficult matter to avoid putting undue pressure upon the eye-ball.

Messrs. Allen and Hanbury have made, from a rough model which I sent them, an instrument in which this difficulty has been overcome. The illustration shows the shape of the needle-holder, which measures about 5 inches in length by about $\frac{3}{4}$ inch at the widest part of the handle. The needle is held firmly in place by continuous pressure from a spiral spring situated between the blades of the handle. The shape of the jaws and the position of the spring are so adjusted that the needle is gripped at a maximum of mechanical advantage ; hence, although the grip is so secure, it can be readily released by the exertion of light pressure on the handle blades.



The spring is kept in place by two studs on the blades of the handle and can be easily removed for cleaning purposes. Springs of different strength are supplied with the instrument, so that the user can adjust the pressure to suit his own requirements.

The needle-holder is neatly finished ; the jaws will take ophthalmic needles of any shape or size ; and with this instrument it is impossible for the needle to stick at a critical moment. It has been found particularly useful in advancement operations and in suturing scleral wounds after magnet operations.

NOTES FROM SOME CONTINENTAL EYE CLINIQUES.

(*Fourth Article*).

BY

ERNEST THOMSON, M.D.

SUB-EDITOR OF THE "OPHTHALMOSCOPE;"
SURGEON TO THE GLASGOW EYE INFIRMARY.

IV.—ZÜRICH.

The Augenklinik.

In the immediately preceding article, that on the Berne *Klinik*, a good deal has been said about the internal details of a modern eye hospital. On that account in the present communication I shall not enlarge too much upon architectural arrangements. Nevertheless, I feel called upon to say that the University Augenklinik at Zürich, although it is already fifteen or sixteen years old, is quite one of the handsomest Continental eye hospitals I have seen. The corridors, staircases, and wards are remarkable for their roominess, and, a thing I have never yet seen, every room, even to the dark room, is provided with wash basins and water supply from the main. Indeed, in most of the rooms hot as well as cold water is laid on.

I have the idea that the two principal matters about which readers will be interested to know in Haab's *Klinik* are *ophthalmoscopy* and the *giant magnet.* With regard to the former, I am restricted by the nature of the subject ; yet it will perhaps be profitable to show how the Professor teaches it. As to the latter, I propose to interpret the views held by Haab on the extraction of intraocular foreign bodies, views which must have been largely misunderstood by many who, while using a giant magnet, "after the method of Haab," have made radical alterations in the *technique* perfected by Haab himself, and have blamed the method for their indifferent or even bad results.

Ophthalmoscopy.

At Zürich, as in a number of other *Kliniks*, the out-patient department is formed of a set of rooms opening one off the other; but here one has the additional convenience of an ophthalmoscopic room at either end of a series, which runs as follows:—ophthalmoscopic room, consulting room, refraction room, perimeter room, ophthalmoscopic room.

It is interesting to note that Professor Haab upholds the superiority, for ophthalmoscopy, of the old-fashioned Argand gas burner, unshielded in any way. On each side of the two movable stools—for surgeon and patient—is a half table. On each of these is an Argand gas burner adjustable up and down on a standard. This lamp can be moved to and fro along the table, and is thus available in a moment for ophthalmoscopy or direct illumination. The other halves of the tables belong to the adjacent bays, right and left, a movable black cloth screen dividing each whole table down the middle, so that one half belongs to one bay and the other half to the next bay. In these days of complicated electrical installations, it is somewhat refreshing to find that the acme of convenience has been reached in this simple manner.

The two rooms just mentioned are for the use of the Professor and assistants. In Zürich, as in many other places, the undergraduate student does not come into the out-patient department. He is taught in the lecture hall and in the ophthalmoscopic room, so that if he is to have the best opportunities, a large and properly equipped ophthalmoscopic room is necessary.

The *students' ophthalmoscopic room* is here of an unusual size. It is, in fact, a lecture hall which opens directly off the main lecture hall and is approximately as large as the latter. It is equipped completely with lecturer's desk and blackboard, and is specially ventilated. A switch at the lecturer's hand enables him to illuminate the room in order to make drawings on the blackboard, or to demonstrate points in the various diagrams which hang on the walls.

The centre of the room is occupied by a number of large tables. Each table is divided into four "compartments" by longitudinal and transverse screens standing upon it. On each of these four areas of the table is a movable Argand lamp, and on the floor, beside each such area, are two stools, one for the patient and one for the student. Thus the student, by moving the lamp and changing stools with the patient, can make a complete examination of both eyes within the minimum of floor space. A corneal magnifier is attached to each table by a chain, and the employment of this magnifier is compulsory upon each student in making his examination of an eye. It is difficult to imagine any more thorough, and at the same time practical, teaching in ophthalmoscopy than that given by Haab, his colleague Sidler-Huguenin, and the assistants, to the undergraduate students. I estimated that twenty-eight students and twenty-eight patients can be accommodated in this room with comfort, both with regard to floor space and ventilation.

Operations.

The Operating Room.—Haab prefers to perform his cataract operations with the patient in bed, with a view to the least possible disturbance after operation. In order that this may be carried out conveniently, it is necessary that cataract wards for men and women should be on the same floor with the operating room. Here, in Zürich, the operating room is situated between two wards, for male and female cataract patients respectively. Large doors open off these wards directly into the operating room, and the beds are wheeled in and out.

This arrangement has certain obvious advantages, but to me it appears that direct communication between these wards and the operating room is a disadvantage.

Above the operating table hangs a small-sized arc lamp. When artificial illumination is required, this is used in association with a large hand lens held by an assistant.

Magnet Operations.—A considerable amount of criticism has been directed against Haab's method of extraction of foreign bodies from the interior of the eyeball. Operators have said that in using Haab's method they have had bad results. To this, Haab replies that his technical details have been misunderstood, and that the methods employed, and often the magnet used, have not really been his methods or his magnet.

One of my principal objects in going to Zürich was to learn about the use of the giant magnet by Haab himself, and I shall now endeavour to make as clear as possible to English readers the *technique* which he employs and the points upon which he insists.

(1) The giant magnet is an instrument for *diagnosis*, as well as for treatment. If there is no *diagnostic reaction* with the magnet, radiography and the sideroscope are to be employed; but in ordinary cases, where a magnetizable splinter is in question, these procedures are a waste of valuable time. A study of the lines of force from the point of the Haab magnet, when opposite the centre of a cornea, shows that these lines curve in such a way that they actually seek out the foreign body, no matter in what part of the eyeball it may lie.

(2) Time is of the utmost value in recent cases. Every minute wasted is one more minute towards the development of micro-organisms which may have entered the eye. No longer time than thirty minutes is, as a rule, allowed to elapse (in Zürich) between the patient's entry into the *Klinik* and the removal of the foreign body. These thirty minutes suffice for examination, cleaning of eye and eyelids, cocaine-atropinization, and the performance of the operation.

(3) The patient must be free to jerk his head away from the magnet. No greater mistake in *technique* can be made than in so fixing the head that it cannot be jerked back reflexly at the moment when the magnet is applied for diagnosis. When a patient is laid upon his back, he cannot get away from the magnet which is suspended over him, nor is it possible for any operator to be sufficiently quick in the withdrawal of a massive magnet, no matter how well suspended and balanced the latter may be. A foot-switch is really an essential in the conduct of the operation, but it is necessary that the pain-reflex of the patient and the foot-switch controlled by the operator should be both employed in stopping the action of the magnet, so as to prevent the foreign body from lodging in the ciliary region or penetrating the iris when, by the pull of the magnet, the foreign body has been started from its position. It is obvious that the patient's reflex withdrawal of the eye from the magnet is quicker than the action of the operator with the foot-switch, and immensely quicker than the removal of the magnet from the eye.

(4) The scleral route is almost never necessary. It may, in any particular case, be the shortest route, but is also the most dangerous one. It is true that in drawing a foreign body into the anterior chamber the edge of a hitherto uninjured lens may be wounded. Haab has shown, however

experimentally in pigs' eyes, that such wounding of the lens by a foreign body travelling around it is rare, except with very large splinters. Foreign bodies never come through the lens to the magnet. They always travel round it and come through the zonule.

I have now mentioned the chief points upon which Haab insists as being essential, and shall proceed to describe the actual manœuvres in the case where it is supposed that a magnetizable foreign body has lodged in the eyeball.

The patient is prepared as rapidly as possible, cocaine is instilled, and an effort is made to dilate the pupil with atropin. The patient sits on a stool adjustable for height.

The magnet has no rheostat. If the foreign body is supposed to be small, the eye is brought quite close to the magnet, so that the point of the latter is opposite the centre of the cornea. The current is then switched on full strength. As a rule, the diagnosis is completed by the foreign body immediately bulging the iris. The patient feels sharp pain and reflexly withdraws his head. The operator cuts off the current.

Once the foreign body is behind the iris it must be coaxed into the anterior chamber by appropriate movements of the eye in relation to the magnet, while the current is momentarily on and off by means of the foot-switch. It must not be allowed to bore its way through the iris ; the eye movements must be so directed that the metal comes through the pupil. Once in the anterior chamber it sinks to the bottom thereof, because the position of the patient allows it to do so. When the wound of entry is not available, Haab then makes a vertical incision with a Graefe knife, half way between the middle and the limbus of the cornea (preferably to the left side of either cornea), which must be about twice as long as that diameter of the splinter which will occupy it. An effort should be made not to lose aqueous. The incision—or the original wound it may be—is brought opposite the tip of the magnet and lightly pressed against it. The current is switched on, and usually the metal is immediately extracted.

Extraction with the giant magnet is very difficult if the anterior chamber be empty. If much aqueous has been lost, it is better either to wait till it has re-collected or to use a hand magnet, the point of which can be introduced into the anterior chamber.

In the case where the foreign body is supposed to be large, the eye must not be so close to the magnet when the current is switched on. It must be gradually approached to it. Large pieces of metal, especially when the lens does not seem to have been wounded, *may* be removed by the scleral route, but Haab selects this route only very rarely.

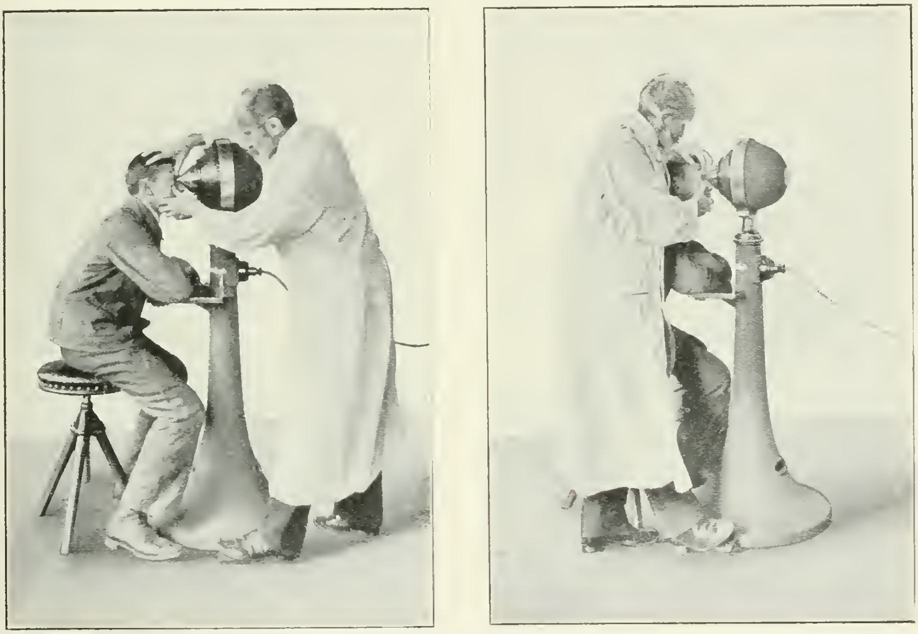
In some cases the foreign body is embedded in the posterior part of the eyeball, or in an exudate, and does not respond to the magnet as thus applied. Even here Haab does not resort to localization until he has tried the following manœuvres in turn :—

Firstly, with the magnet point opposite the corneal centre, the current is repeatedly switched on and off.

Secondly, if this fails, the distance between the magnet and the posterior part of the eye is shortened by placing in succession opposite the magnet point the nasal, temporal, and other parts of the equator, rapidly making and breaking the circuit at each position. If this manœuvre is successful, if the metal is drawn by the magnet to the equator of the eyeball, the fact is manifested by a slight pain-reaction. The current must be at once switched, off and then the corneal apex directed again to the magnet pole. The usual procedure is then followed for getting the foreign body into the anterior chamber. Great care is necessary, in thus doing the operation in two stages, not to draw the metal along the wall of the globe and into the ciliary body. As has been stated above, as soon as it has been drawn to the equatorially placed magnet-point the current must be broken and not again made until the eye is in such a position that the metal will pass from the equator to the back of the lens.

Only when all these methods have failed to localize and to remove the metal, does Haab make use of radiography and the sideroscope.

The position which Haab takes up in this matter seems to me a singularly strong one.—Do what you can right away. If the foreign body is magnetizable and within reach, the magnet will diagnose and treat at the same moment. Delay is dangerous and radiography may mean delay, almost always does mean delay. If the foreign body is not within the reach of the magnet used as above described, nothing has been done to prejudice further investigation as to its nature and position, and nothing has been done to prejudice further treatment, possibly of a more heroic nature.



Professor Haab operating the New Magnet.

Recognising that for small foreign bodies the strongest magnet possible is not too strong, and that the surgeon with the most powerful instrument has the best chance of reaching such small splinters, Haab has recently had a new model constructed of greater strength and of more convenient shape than the previous one. Since he employs no rheostat but depends largely on distance for modification of the pull, he has in this model provided four different magnet-points, the longest of which is employed in the extraction of large foreign bodies. The illustrations show Professor Haab in two positions for operating the magnet. It will be noted that this model is single-ended, that it is tapered so as to interfere as little as possible with the operator's vision, and that it is provided with an arm rest for the patient.

Further information regarding the magnet may be obtained from the makers, Maschinenfabrik Oerlikon, Oerlikon, near Zürich, Switzerland.*

Other Surgical and Therapeutical Notes.

Buphthalmus and its treatment.—Haab appears to have an unusual number of these cases under his care and within call when wanted. I examined cases of buphthalmus of almost every age from infancy to adult life. I saw a girl, acting as nurse in the hospital, who, commencing from early infancy, had had repeated operations. Her patient at the moment was an infant less than six months old with bilateral glaucoma of severe type. In the adult (the nurse) the glaucomatous process had been almost, if not quite, checked, although for precaution she still used myotics. The infant, of whom this nurse had charge, was about to have operative treatment commenced, and a day or two later I witnessed the first operation. I saw quite a number of those interesting cases of "*Bändertrübung*" (ribbon-like opacity) of the cornea, due to rupture of the membrane of Descemet in this disease.

The *treatment* which Haab has adopted, and upon which he mainly relies, is repeated sclerotomy; not once or twice, but over and over again. Sometimes small peripheral iridectomies are done later on.

The sclerotomy method employed is that of de Vincentiis, in which, as the knife is withdrawn after making the sclerotomy, the point is swept up (or down as the case may be) and made to incise the ligamentum pectinatum. In performing this operation Haab prefers to fix the eye on the side to which the knife-edge is directed. Thus, if the sclerotomy is made in the upper part of the sclera, the fixation forceps is applied over the superior rectus region. Pilocarpin, 2 per cent., is employed for months and years after all glaucoma operations. I gathered that the de Vincentiis operation is also the usual one when it is decided to operate on a case of glaucoma simplex.

Tuberculin.—The question of treatment by tuberculin is one which I have asked in nearly every *Klinik* visited. From the answers obtained it seems clear that ophthalmologists fall into three groups in regard to treatment by tuberculin—namely, those who are enthusiastic, those who still use it but are doubtful whether it is of any real service, and those who have had enough of it and have given it up altogether.

Haab says that he has tried a great many varieties of tuberculin. He has seen some cases which seemed definitely to be improved. He uses it occasionally, but is not enthusiastic.

Subconjunctival Injections are considerably employed in this *Klinik* in chronic conditions, such as high myopia with early macular changes, in the later stages of interstitial keratitis, and in chronic irido-cyclitis. It is recognised that the *rationale* of the treatment is in part, at least, that the patient remains under control in the wards. The solution commonly employed is sodium chloride, commencing with "normal" solution and increasing to 3 per cent. The saline injection is preceded by one of a few drops of 3 per cent. cocain, and only about 1 c.cm. of saline is injected.

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*The Editor may be allowed to add that Professor Haab, after reading the proofs of the foregoing article, has been kind enough to express his special appreciation of what has been set down on the subject of magnet *technique*.

TRANSLATIONS.

ON TEARING-OUT OF THE IRIS IN ABSOLUTE GLAUCOMA.*

(L'arrachement de l'iris dans le glaucome absolu.)

BY

DR. SAMEH BEY,

CAIRO.

THE operation of tearing out of the iris (*arrachement*) consists in getting a firm hold of that membrane with the usual curved forceps, after paracentesis of the anterior chamber, and drawing it outwards by a movement which is somewhat sharp (*brusque*) yet sustained, until, detached from its ciliary insertion, it comes out of the eye *en bloc*.

After this definition I do not think I need give any fuller details.

The idea of deliberately practising this operation was the result of an operative experience.

In April, 1905, a girl of 12 years was brought to my *clinique*, at Kalaoun, from her home at El-Manasrah, suffering from an adherent leucoma, which was slightly bulging, and which was accompanied by attacks of pain due to secondary glaucoma. At the instant when, having drawn out the iris, I was about to do an iridectomy, the patient made a sudden movement which resulted in complete tearing out of the iris. There was nothing left to do but to put on a dressing.

The results of this unintentional operation were excellent. The attacks of secondary glaucoma ceased, and the eyeball recovered its normal shape and tension.

In the month of May of the same year one of my friends sent to me, at the same *clinique*, a woman of 55 years, named Fattema Mohamed, suffering from absolute glaucoma of the left eye with intense head pains. Tension + 3. Engorgement of the ciliary veins, secondary cataract. In a word, the condition seemed to demand enucleation, but I wished first to try the effect of tearing out the iris of set purpose, since this had given me such a brilliant result when involuntarily done.

I began by operating on the left eye, which was the most degenerated. The right eye, affected with chronic glaucoma, had been iridectomised in the previous year without much result.

The patient was unable to recognize fingers at one metre.

After a large superior paracentesis, performed with my bent lance-knife which has a convex edge, I withdrew the atrophic iris with one pull. It came out *en bloc*. This was the whole operation.

After that all went well. The pain and hypertension disappeared. The result was that the patient asked me to repeat the operation on the other eye, which had already been iridectomised, and which was still painful from time to time. Eventually I performed the operation of *arrachement* of the iris, and the patient maintained and even improved upon her former vision.

The following observation shows the importance and efficacity of this intervention in subacute or malignant fulminating glaucoma, which develops rapidly, and fatefully progresses towards blindness in spite of all known means of treatment. Such treatment is not even effective in abolishing the unbearable pain.

---

* Translated from *La Clinique Ophtalmologique*, 10 décembre, 1910.

An arthritic lady in the upper ranks of society, 65 years of age, was seized suddenly, two hours after a full dinner in the evening (in June, 1895) with repeated vomiting, and with intense pains in the right eye, pains which radiated all over the head, and were accompanied by general reaction.

The eye, which was very sensitive to light, was strongly injected, the eyelids were œdematous and lacrimation was abundant. At the end of two days there was excessive hypertension, the cornea was cloudy and insensitive to touch, the pupil was dilated and gave the characteristic greenish-grey reflection, and the anterior chamber was very shallow. Finally total blindness completed this sorrowful train of symptoms.

Having exhausted, without any effect, all the sedative and antiphlogistic drugs, myotics and so on, I finally decided to perform *arrachement* of the iris. When this operation had been done the pains ceased completely and did not return. The patient eventually retained enough vision in this eye to go about alone when the unaffected fellow eye was closed.

The tension fell to $=1$. (Presumably this means normal. E. T.) When an ophthalmoscopic examination was possible it was found that there was a distinct excavation of the papilla which had an appearance quite characteristic of glaucoma.

As a result of these three observations, this operation became, so far as I am concerned, the usual one in subacute glaucoma, in absolute glaucoma (which, unfortunately, is so common among us, for want of timely intervention, and which is generally considered as inoperable), and also in secondary glaucoma due to leucoma adherens, and in staphylomata of moderate size.

This operation often stops the evolution of the glaucomatous process. It seems rational to attribute these fortunate results to the great freeing of the iridic angle and, as a consequence, of the anterior lymphatic channels.

The advantages of this operation are, then, quite superior to those of iridectomy and to anterior and posterior sclerotomies which often are powerless against the pains, and powerless against the degeneration of the eyeball which is the termination of glaucoma.

Taught by such successes I do not hesitate to perform this operation whenever there is occasion for it.

Thus I am enabled to publish the following statistics, which deal with a total of 171 cases operated on during the last five years. The results have been always satisfactory and like those which I have given above.

		Absolute G.	Fulminating G.	G. Secondary to Leucoma.	Staphyloma.	Total.
Children	Boys	—	—	16	19	35
	Girls	—	—	14	25	39
Adults	Men	20	5	8	10	43
	Women	24	6	10	14	54
	Total	44	11	48	68	171

Ernest Thomson.

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TRANSLATION.

6.—GUIDE TO THE MICROSCOPIC EXAMINATION OF THE EYE.

(*Continued.*)

BY

PROFESSOR R. GREEFF,

DIRECTOR OF THE UNIVERSITY OPHTHALMIC CLINIQUE IN THE ROYAL CHARITY HOSPITAL, BERLIN,
WITH THE CO-OPERATION OF

PROFESSOR STOCK (FREIBURG)
PROFESSOR WINTERSTEINER (VIENNA)

TRANSLATED FROM THE THIRD GERMAN EDITION,

BY

HUGH WALKER, M.A., M.B., C.M.,

OPHTHALMIC SURGEON TO THE VICTORIA INFIRMARY, GLASGOW.

Specific Methods of Staining.

It has been pointed out that the older stains are adapted for the demonstration of all the nuclei present in the tissue. In recent times, however, the art of staining has been elaborated, and methods have been discovered which act in a specific manner on definite elements without affecting others. There is quite a number of these methods, and they are of great value to the ophthalmologist.

1. WEIGERT'S STAIN FOR THE MEDULLARY SHEATHS.

By this method the medullary sheaths of the nerve fibres alone are rendered bluish-black.

1, For the success of the process, which gives beautiful pictures of degenerative changes in the optic nerve, it is indispensable that the tissues should be hardened from the first in Müller's or Erlitzki's fluid ; tissues prepared otherwise are unsuitable. (For the exception formed by formalin, see below.)

The tissues are not washed after leaving Müller's fluid, but are transferred directly to alcohol.

2. Imbedding in celloidin.

3. The celloidin block containing the tissue is placed for 24-48 hours in a saturated aqueous solution of acetate of copper diluted with an equal volume of water. This stage is best carried out in the incubator. The preparation takes on a permanent bluish-green colour.

4. The block is placed in alcohol, 70 per cent. for at least 24 hours.

5. Sections are made.

6. The sections are stained for $\frac{1}{4}$-24 hours in *Weigert's Hæmatoxylin*, which consists of—

Hæmatoxylin	1
Absolute alcohol	10
Distilled water..	100
Saturated aqueous solution of lithium carbonate	1

The solution of lithium carbonate is not added to the hæmatoxylin till the sections are ready to be stained, since the mixture does not keep well.

7. Washing in water till the stain is no longer given off.

The sections must be handled very gently since they are now very brittle. After differentiation they become plastic once more.

8. Differentiation in the following solution:—

Borax	4
Ferricyanide of potassium	5
Distilled water	200

No rule can be given regarding the length of time during which differentiation should be continued, since this depends upon the tissue and the thickness of the section. The sections are left in the solution till the nerve fibres, so far as they are supplied with medullary sheaths, appear dark violet, and the other structures, *e.g.*, the sheaths of the optic nerve, become bright brown or colourless. If in the case of thick sections the differentiation is slow in appearing, the sections should be placed in alcohol for 24 hours, and once more passed through the ferricyanide solution.

9. Thorough washing in water for 2 or 3 days.
10. Alcohol.
11. Xylol.
12. Canada balsam.

The medullary sheaths appear bluish-black, the degenerated portions bright brown. Thus, in cases of multiple sclerosis, bright foci of degeneration are frequently observed in the optic nerve, and in tabes with partial atrophy of the nerve certain strands may be recognised as affected.

N.B.—When the tissues have lain too long in alcohol they become greenish and do not react well to Weigert's stain In such cases they should be left for a few hours in a 2–3 per cent. solution of chromic acid before being imbedded.

Formalin can be employed for hardening, the process occupying only 4 or 5 days. The tissue is placed in

Bichromate of potash	5
Chrome-alum	2
Distilled water	100
Formalin, 10 per cent.	10

Or the pieces may be hardened in formalin, and then placed in the chromic mixture for 4 days.

Weigert's New Method.—Hardening in Müller's fluid for 4-6 weeks. Treatment for 12-24 hours in:

Chromium fluorate pure	7·5
Copper acetate	15
Dilute acetic acid	15
Distilled water	300

This solution must be boiled for an hour or longer till it assumes a green colour.

Washing in water or, better, 75 per cent. alcohol.

Staining for 6–12 hours in a mixture of equal parts of the following solutions:

1. One gramme of hæmatoxylin is dissolved in 9 c.cm. absolute alcohol, and added to 90 c.cm. 96 per cent. alcohol. The mixture should be at least three weeks old.

2. Liquor ferri sesquichlorati	4
Distilled water	100

Washing in water for 6 hours.

Differentiation in:

Borax	12·5
Ferricyanide of potassium	10
Distilled water	500

This should be filtered.
Washing for 12 hours.

2. Pal's Stain for the Medullary Sheaths.

Pal's method is a modification of Weigert's. It is simpler and possesses this advantage, that it may be followed by a nuclear stain. The finer fibres are apt to be decolourised, as it is very difficult to determine when the differentiating process should be interrupted.

1. Hardening in Müller's fluid.
2. No washing.
3. Completion of the hardening process in alcohol.
4. Imbedding in celloidin.
5. Sections are made.
6. These are treated with a saturated solution of copper acetate in the incubator for 24 hours.
7. Washing.
8. Staining for 24 hours in Weigert's solution of hæmatoxylin to which a few drops of a saturated solution of lithium carbonate are added before use.
9. Washing in water containing a few drops of a 1-2 per cent. solution of lithium carbonate till the sections appear deep blue.
10. The sections are now placed in ¼ per cent. solution of permanganate of potash for perhaps 20-30 seconds, till the non-medullary substance of the nerve appears yellow. This solution keeps badly, and should therefore be specially prepared or diluted from a concentrated solution as required.
11. Further differentiation in

Oxalic acid	1
Sulphite of potash	1
Distilled water	200

The medullary substance should now become dark blue while the sheaths and rest of the tissue are decolourised. If this does not happen after a few seconds, the section is returned to No. 7, then to 8, 9, etc., and these stages are repeated till the desired effect is obtained. The sections may be examined under the microscope to determine when the non-medullary substance has become colourless. Then the process is interrupted. The fibres of the ciliary nerves possess medullary sheaths, and therefore appear dark blue.

12. Thorough washing in pure water.
13. Alcohol. 14. Xylol. 15. Canada balsam.

In longitudinal sections of the optic nerve the medullary sheaths are seen to disappear gradually at the level of the lamina cribrosa. The retina of the rabbit contains for the most part medullated nerve fibres, and these react to the stains of Weigert and Pal.

If desired, the section can be stained with carmine and orange G. The nuclei are then red, the connective tissue yellow, and the nerve fibres dark blue.

3. Marchi's Method.

Marchi's method (see Marchi *Rivista sperimentale di freniatria e di med. legale*, 1887, XII, and Singer und Münzer, *Beiträge zur Kenntniss der Sehnervenkreuzung*, LV., *Band der Denkshriften der mathnaturw. Klasse der kaiserl. Academie der Wissenschaften zu Wien*, 1888) possesses the remarkable and valuable property of staining the medullary sheaths of degenerated nerves, or the products of their disintegration, deep black, while the medullary sheaths of the normal nerves are only tinged grey. There is no better method for demonstrating recent and slight degenerative changes in the optic nerve, chiasma, brain, etc.

The tissue must be in no way compressed or crushed while being removed from the body.

The optic nerve *in toto* is placed for at least 8 days (if necessary as long as 3 months) in Müller's fluid.

Pieces, which should be as small as possible, are then placed in a freshly prepared mixture of—

Müller's fluid	2
Osmic acid, 1 per cent....	1

for 5-8 days.

Thorough washing in running water, 12-24 hours.

Further hardening in alcohol.

Imbedding in celloidin.

Section-cutting.

Oil.

Canada balsam (best melted by means of heat without any solvent).

When degeneration has taken place, the medullary sheaths break up into fatty globules which are blackened by osmic acid.

The degenerated sheaths accordingly appear black, and the medullary substance is arranged in chains of globules. The medullary sheath of a normal nerve appears bright yellow, or varies from pale grey to olive in colour. In rare cases solitary black drops may be seen between the medullary sheath and the sheath of Schwann.

Of course any fat in the tissue is stained black by the osmic acid.

On the surface of the sections of the optic nerve there is always a plentiful deposit of black masses. These, however, extend for only a short distance into the nerve.

4.—Staining the Ganglion Cells—Nissl's and other Methods.

Nissl's method is an excellent one for demonstrating the finer structure of the nerve cells. Both normal structure and commencing degeneration are rendered evident. By means of this method Bach found certain brightly stained granules in the ganglion cells of the normal retina. They occur throughout the whole of the cell body, and are arranged, in part regularly, in part irregularly, in the almost unstained ground mass.

On the other hand, in degenerating cells, *e.g.*, those of a detached retina, the granules are smaller and are grouped together towards the circumference of the cell. When degeneration is advanced the granules are no longer visible (Bach. von Graefe's *Archiv*, Bd. XLI, Heft iii, S. 62; and A. Birch-Hirschfield, von Graefe's *Archiv*, Bd. L, Heft i, S. 166.)

Nissl's Method.—Nissl has described two processes, both equally good.

A. 1. Small pieces of fresh material are hardened in alcohol gradually increased in strength. Formalin may also be used.

2. The pieces are mounted on a support by means of fish-glue or gum without being imbedded. Imbedding in celloidin is also permissible.

3. Sections are made by hand or with the microtome (30 μ thick.)

4. These are stained in ½ per cent. solution of methylen blue, which is

heated in a watch-glass over the flame of a spirit lamp till bubbles begin to rise (65°-70°C.). The solution consists of—

Methylen blue B. patent	3.75
Venice soap in fine shavings	1.75
Distilled water	100

5. Each section is differentiated in

Anilin oil	20
Alcohol, 90 per cent.	200

till large clouds of stain are no longer given off. This solution should be kept in a dark bottle and protected from the light.

6. The section is transferred to a slide, dried, cleared with oil of origanum or cajeput, again dried, and saturated with benzine.
7. A thin solution of colophonium in benzine is poured over the section.
8. The benzine is driven off by holding the slide over a flame.
9. A cover-glass is applied.

N.B.—After being differentiated the section can be mounted in Canada balsam in the usual fashion.

B. Stages 1, 2, 3, of the alternative process are similar to those of A.

4. The sections are stained in a concentrated aqueous solution of basic fuchsin, which is held over a flame till steam begins to rise.
5. Washing in absolute alcohol, 1-2 minutes.
6. Clove oil, till clouds of stain cease to be given off.
7. Canada balsam.

Held's Modification of Nissl's method gives a double stain, erythrosin being employed to demonstrate the protoplasm in which Nissl's chromatic granules are imbedded (*Archiv für Anatomie*, Bd. I, 1895, S. 396).

Birch-Hirschfeld treats the retina in the following manner (von Graefe's *Archiv*, Bd. I, S. 175).

Thionin-Erythrosin Stain:—

1. Imbedding in paraffin. The sections are fixed to the slide.
2. Staining in a 1 per cent. solution of thionin for about 10 minutes.
3. Rinsing in water,
4. Held's solution of erythrosin is poured over the section.

Pure erythrosin	1
Distilled water	150
Glacial acetic acid	2 drops.

5. Rinsing in distilled water.
6. Alcohol. Oil. Canada balsam.

Nissl's granules are stained blue, thionin being a specific stain for them, the interstitial substance brilliant red.

5. Weigert's Stain for the Neuroglia.

This is the best method for demonstrating the neuroglia although it is not easy to carry out. It yields beautiful results with the optic nerve. Its application to the retina is more difficult. The fibres of the zonule of Zinn are also coloured. (C. Weigert, *Beiträge zur Kenntniss der normalen menschlichen Neuroglia.* Frankfurt, a. M., Diesterweg, 1895).

1. Fixation of the tissue in Weigert's neuroglia-mordant (chrome-alum—copper oxide). The pieces must not be more than $\frac{1}{2}$ cm. in diameter. They lie in the fluid for 8 days, and it is advisable to keep this warm by placing it on the incubator. The fluid is changed on the second day. The tissue should be as fresh as possible.

The mordant consists of—

Chrome-alum	25
Water	100

The chrome-alum is dissolved by heat, and while the solution is boiling the flame is put out, and there is added, first—

Ordinary acetic acid	5

then—

Powdered neutral acetate of copper ...	5

the whole being stirred with a glass rod. After cooling there is added—

Formalin	10

2. Thorough washing in water. Further hardening in alcohol. Imbedding in celloidin.

3. Sections are made, and these are immersed in $\frac{1}{3}$ per cent. solution of permanganate of potash for 10 minutes, carefully washed in water, and then placed in the reducing fluid.

4. The sections remain in the reducing fluid 2-4 hours, where they become decolourised. The reducing mixture consists of—

Chromogen (Höchster Farbwerke) ...	5
Formic acid	5
Water	100

Before use 10 c.cm. of a 10 per cent. solution of ordinary photographic sodium sulphite are added to every 90 c.cm. of the filtered reducing fluid.

5. Staining (modified fibrin method). This is carried out on the slide. The section is first dried, then the stain is poured over it. Staining takes place very quickly (one minute). The stain consists of a saturated solution of methyl-violet in 80 per cent. alcohol. This should be saturated while hot, and decanted when cold. To every 100 c.cm. of this are added 5 c.cm. of a 5 per cent. aqueous solution of oxalic acid.

The sections are dried and treated with iodine, a saturated solution of iodine in a 5 per cent. solution of iodide of potash being poured over them.

7. They are thoroughly differentiated in equal parts of anilin oil and xylol.

8. The anilin-xylol is now removed by means of pure xylol.

9. Canada balsam.

The preparations keep better if they are exposed to daylight for a day or two after being mounted.

(*To be continued.*)

CURRENT LITERATURE.

NOTE.—Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—BUPHTHALMOS.

(1) **Blair, C.—Extensive subconjunctival rupture of a buphthalmic eye; recovery.** *Trans. Ophthalmological Society U.K.*, Vol. XXX, Fasc. 3, p. 228, 1910.

(2) **Höeg, N.—Traumatic scleral rupture in Buphthalmos. (Traumatische Skleralruptur bei Buphthalmos.)** *Zeitschrift für Augenheilkunde*, Februar, 1911.

(3) **Spielberg, Chaja.—A contribution to the pathogenesis of congenital hydrophthalmos. (Beitrag zur Pathogenese des Hydrophthalmus congenitus.)** *Klin. Monatsbl. f. Augenheilkunde*, September, 1911.

(4) **Axenfeld, Th.—Remarks on hydrophthalmus and the influence of chloroform narcosis on the ocular tension. (Bemerkungen über hydrophthalmus und den Einfluss der Chloroformnarkose auf die intraocular Spannung.)** *Klin. Monatsbl. f Augenheilk.*, Oktober, 1911.

(1) Apart from the fact that the patient, a child, aged five years, had sustained a subconjunctival rupture of a buphthalmic globe, this case by **Blair**, of London, shows the hereditary nature of buphthalmos and its frequent association with other congenital defects. Thus, the patient was affected with double "club-hand" while her two cousins on her father's side had, the one congenital dislocation of the hip, and the other mental deficiency.

SYDNEY STEPHENSON.

(2) **Höeg**, of Copenhagen, cites a case of rupture of a buphthalmic eye by a blow from a cow's horn. The eye was saved with V.=less than 4/60.

T. HARRISON BUTLER.

There are two theories to account for the origin of congenital hydrophthalmos: the hypersecretion theory and the retention theory. According to Fräulein **Spielberg**, of Berne, the latter has, within the last few years, received the greater amount of support from pathologists. The anatomical lesions vary in different cases, but whatever their nature, they act by causing an obstruction to the outflow of intraocular fluid through the angle of the anterior chamber. When inflammatory changes are found, they are not to be looked upon as exciters of hypersecretion, but as indirectly leading to obstruction of the channels for filtration. The author describes the case of a child first seen at the age of three months. Treatment with myotics failed to produce permanent improvement, and anterior sclerotomy was performed in both eyes. The child was in poor health from bronchitis, enteritis, and other troubles, and died a day after the operation. The most important lesion found on microscopic examination of the eyes was an entire absence of Schlemm's canal. There was no trace of inflammation in the neighbourhood of the filtration angle. In such a case as this, the author holds, the only possible diagnosis is one of aplasia of Schlemm's canal. Sclerotomy is indicated as the only useful surgical measure, since iridectomy would produce no result, except in virtue of its accompanying sclerotomy. A. J. BALLANTYNE.

(4) The spontaneous recovery of hydrophthalmus is rare, but it does occur, and **Axenfeld**, of Freiburg, has shown in a former paper that cases of so-called cornea globosa and megalocornea are to be looked upon as cases of spontaneously cured hydrophthalmus. One evidence of this is the existence in these cases of the ruptures of Descemet's membrane characteristic of hydrophthalmus. He has seen three further cases bearing on the same point. In two of them one eye was blind with hydrophthalmus, while the other eye had recovered and showed megalocornea. The third case had one normal eye and the other a spontaneously cured hydrophthalmus. In one of the "recovered" eyes the tonometer measurement was as high as 34 mm. of mercury, and in another 40-48 mm. The author calls attention to the fact, but does not attempt to explain it.

Regarding the effect of chloroform narcosis on the tension, he finds that the tension during quiet anæsthesia is several millimetres less than that taken before the anæsthetic. This fall also occurs in cases of simple, and in some cases of inflammatory glaucoma, but not in cases of extreme hypertension nor in absolute glaucoma. The failure of the tension to fall under the use of chloroform he regards as a bad prognostic sign. A. J. BALLANTYNE.

II.—THE PATHOGENESIS OF GLAUCOMA.

(1) **Bürgers, T. J.—On the interchange of fluid in the eye. (Ueber den Flüssigkeitswechsel des Auges.)** *Zeitschrift für Augenheilkunde*, März, 1911.

(2) **Wessely, K.—On the intraocular exchange of fluid. (Ueber den intraokularen Flussigkeitswechsel.)** *Zeitschrift für Augenheilkunde*, April, 1911.

(3) **Parisotti. — Experimental researches on the pathogenesis of glaucoma. (Patogenesi del glaucoma — Ricerche sperimentali.)** *Rivista Italiana di Ottalmologia*, April-May, 1911.

(4) **Kümmell, R.—Investigations upon glaucoma and blood pressure. (Untersuchungen über Glaucom und Blutdruck.)** von Graefe's *Archiv f. Ophthalmologie*, 30 Mai, 1911.

(5) **Hamberger, C.—On the outflow from the eye. (Ueber den Abfluss aus dem Auge.)** *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1911.

(6) **Bjerrum, J.—Remarks on the pathogenesis of glaucoma. (Bemerkungen zur Pathogenese des Glaucoms.)** *Klin. Monatsbl. f. Augenheilk.*, Januar, 1912.

(7) **Parsons J. Herbert.—Theory and practice in the treatment of glaucoma.** *Lancet*, January 6th, 1912.

(8) **Hill, Leonard.—A note on glaucoma.** *Lancet*, January 27th, 1912.

(1) **Bürgers**, of Königsberg, thinks that the question of fluid exchange in the eye can be investigated from the standpoint of serology and immunity, and by a study of infective processes. The paper before us is chiefly a summary of recent serological research in the domain of ophthalomology and partly a record of personal research. Both are valuable, but the author rather loses sight of the object of the paper, for in marshalling his facts, he says little about fluid exchange, and can hardly be said to have advanced our knowledge materially. The most important point made is that the fluid exchange is very feeble as regards the vitreous, the flow of protective and immunising bodies in response to irritation is here slow and imperfect, and, in consequence, infective processes are dangerous and severe in this humour. The opposite is the case with regard to the aqueous. The normal aqueous contains a minimal amount of antibodies, and organisms fail to find suitable pabulum for effective growth. Irritation is followed by an increase in this pabulum as the aqueous becomes albuminous, but *pari passu* antibodies pass into it, and a greater degree of immunity obtains than in the vitreous. In consequence, the cornea is more resistant to infection than is this latter structure.

T. HARRISON BUTLER.

(2) **Wessely**, of Würzburg, alludes to some of the arguments adduced by Weiss against the currently received theories of the ocular circulation, and

seeks to modify them. Weiss does not believe that the hypothesis of a constant circulation of lymph in the eye has yet been proved, and in his paper he brought many weighty arguments against it. Wessely has not considered these arguments *seriatim* and shown them to be unsound; many of the points insisted upon by Weiss are not even alluded to by him. A critical study of the paper, which is not by any means a good example of clear, concise, physiological reasoning, leaves us with the feeling that Weiss has not been answered. In reality, the question narrows itself down to one of the velocity of the lymph stream. Few will now be found to deny that when the aqueous is evacuated it is replaced by fluid which is secreted by the ciliary body, and that any loss of aqueous, however brought about, is so replaced. The point at issue is, at what rate is this process carried out in the normal eye? Is there a constant rapid flow, or is the stream so slow that a state of practical stagnation exists? Between these two extremes the truth probably lies, but the balance of evidence seems to point to a very slow circulation of lymph, so slow indeed that fluorescein injected into the posterior chamber takes at least several minutes to appear in the pupil. The question is intimately bound up with another cognate point.—Is the process one of osmosis, pure and simple, or is it a vital manifestation? Wessely points out that physiologists have practically abandoned Ludwig's theories as regards the secretion of other fluids in the body, such as urine and lymph. It is therefore not probable that the eye is physiologically entirely different from the rest of the body. The conditions in the eye are not quite the same as elsewhere. The formation of aqueous depends entirely upon the blood pressure; there is no such thing as *post-mortem* secretion of aqueous. It is probable that the element of osmosis is a larger factor in the eye than in other parts of the body. It is equally impossible to exclude the vital factor. The living cell walls certainly can and do modify the character of the exudate. Wessely discusses the results obtained by increasing the albumin content of the aqueous by subconjunctival injection of saline solution, and then evacuating the aqueous. He finds that two hours are required entirely to renew the original amount of albumin. The first renewal contains only 4/10 of the original amount of albumin found after the subconjunctival injection of 1 cc.m. of a 5 per cent. solution of sodium chloride. He has constructed a curve of the actual amount of non-diffusible substance and the calculated amount. The two curves practically coincide. The methods employed are not described, and it is difficult to grasp the exact nature or significance of the experiment. Wessely decides that the normal aqueous formation is extraordinarily slow (*ausserordentlich langsame*), far slower than any of our methods of research can appreciate. Therefore, for all practical purposes, Wessely's view is not very far from that put forward by Weiss. T. HARRISON BUTLER.

(3) **Parisotti**, of Rome, has endeavoured to discover experimentally whether the closure of the angle of the anterior chamber has the necessary effect of producing glaucoma, as has generally been thought.

To this end, he attempted to bring about the closure in rabbits' eyes by multiple electrolytic punctures at the angle of the chamber. In one case at least, and that in which the microscope showed that the electrolysis had most completely effected the desired result, there was, during life, an increase of tension, and a cupping of the optic disc.

Parisotti does not regard his communication as conclusive, but as a preliminary step on a hitherto unexplored path, which may lead to a better knowledge. HAROLD GRIMSDALE.

(4) **Kümmell**, of Erlangen makes use of what is called the auscultatory

method. His procedure is shortly as follows.—After applying the tourniquet to the arm the pressure is quickly increased till it equalises the systolic pressure. If he now auscultates about one inch below, no sound is, of course, heard. If the pressure is then sufficiently reduced so that the systole, but not the diastole, can overcome the obstacle, he hears low sounds corresponding to the rhythm of the heart action, and the sound becomes louder as the pressure further decreases. But as the pressure approaches the diastolic, the sounds become fainter, and, finally, disappear altogether. This method is fairly accurate, and Kümmell's investigations refer to both the systolic and the diastolic pressure and to their difference, the so-called "amptitude." He examine thirty cases of different forms of glaucoma in connection with a great number of control cases, which must be of the same age as the patients. His conclusions are very different from Kraemer's, who could not find any direct connection between blood pressure and glaucoma. Kümmell finds a well-marked hardening of the blood pressure mostly for the systole ; also often other symptoms of diseased cardio-vascular-urinary system. The connecting link might be found in a local ocular arteriosclerosis, which has been anatomically proved, and which may be wanting in extensive arteriosclerosis, which thus comparatively rarely leads to glaucoma. He thinks that glaucoma without increase of blood pressure, although certainly occasionally met with, should always excite suspicion as to its primary origin. R. GRUBER.

(5) **Hamberger,** of Berlin, urged objections to Leber's theory that the outflow from the eye is principally conducted through Schlemm's canal by the purely mechanical method of filtration. Leber's experiments were performed upon the dead, and generally the enucleated eye, under perfectly abnormal conditions. Hamberger injected sodium indigo-sulphate into the anterior chamber of rabbits. Were there really a measurable outflow from the eye, it would be expected that the blue colouring matter would appear in the anterior ciliary veins, especially in albinos. This was, however, not the case. As a matter of fact, the dye appears in the tissues in a purely mechanical manner, and thence is forced into the blood vessels. Everything points to the view that the outflow from the eye, instead of being mechanically constant, is immeasurably slow, and follows the ordinary paths of absorption. Experiments with fluorescein show that it does not, unless the eye be diseased, reach the inside of the eye. Clinical facts, glaucoma with obstructed spaces of Fontana, prove nothing, for, on the one hand, we often get glaucoma with an open angle, and, on the other hand, the angle is never occluded without severe disease of the anterior surface of the iris.

T. HARRISON BUTLER.

(6) **Bjerrum,** of Copenhagen, brings forward a number of arguments to disprove the commonly accepted view that the primary fault in glaucoma is obstruction of the filtration channels, this leading in turn to rise of tension, and to irritative symptoms due to stasis in the uveal veins. He states that in acute glaucoma the injection is pericorneal, there is chemosis, and the lids are œdematous. Moreover, there may be posterior synechiæ and deposits on Descemet's membrane. These conditions could not be accounted for by stasis, and are much more suggestive of inflammation. Experiments have shown that excessive increase of the ocular tension renders the eyeball bloodless, but does not lead to stasis in the uveal veins, and does not dilate the pupil. Bjerrum holds that the different forms of glaucoma can be explained on the basis of an inflammation of a special kind, chiefly affecting the ciliary body, and leading to hypersecretion. This hypersecretion is the cause of the increased intraocular pressure. Special toxines are invoked to account for the inflammation. The application of Bjerrum's theory to the

different manifestations of glaucoma is as follows.—The prodromata are due to a transient inflammation caused by a small amount of the toxine. In glaucoma simplex the toxines are acting in a modified degree, and lead to hypersecretion without inflammatory symptoms, which, however, may come on later. The adhesion of the iris to the cornea in acute glaucoma is the result, not the cause, of the disease. Secondary glaucoma due to exclusion of the pupil can usually be attributed to inflammation. The same is true of glaucoma following luxation of the lens. Mydriatics cause hypersecretion, hence there is sometimes a danger of glaucoma resulting from their use. Myotics act favourably by diminishing secretion. In neither case is the change in the size of the pupil the essential factor. It has been shown that under the use of eserine, agglutinins, hæmolytic amboceptors, etc., pass into the aqueous in greatly increased amount. Perhaps the favourable effect of eserine in glaucoma may be in part due to such substances being produced to neutralise the toxines which cause the disease. A. J. BALLANTYNE.

(7) **Parsons**, of London, reviews very clearly the commonly received theory of intra-ocular tension, with particular reference to its bearing upon the treatment of chronic glaucoma. The several operations devised by Herbert, Lagrange, Heine, Fergus, and Elliot are mentioned. So far as their results go, they support the view that the establishment of a "filtering cicatrix" is as much a cure for chronic glaucoma as iridectomy is for acute primary glaucoma. The remainder of the communication, which should be studied in the original, is occupied in rebutting T. Henderson's arguments that the walls of the eyeball are rigid, in explaining away that gentleman's criticisms of certain of Parson's published statements, and in pointing out the possible fallacies of Henderson's working model of the circulatory mechanism of the intra-ocular pressure. Leaving on one side these polemical discussions, as not well suited for the columns of THE OPHTHALMOSCOPE, the practical conclusion of Parson's paper is that "the formation of a filtering cicatrix holds out the best hope of alleviating chronic glaucoma." SYDNEY STEPHENSON.

(8) **Hill**, of London, controverts Parson's view, as expressed in his recent communication to the *Lancet*, namely, that the amount and composition of lymph are dependent upon a difference in pressure on the two sides of the capillary wall. Hill believes, on the contrary, that the flow of lymph is controlled by the vital selective activity of the tissue cells. The cause of the increased tension in glaucoma primarily is altered metabolism. This is produced by bacterial toxins or otherwise, and results in chemical changes in the colloids of the eye, which swell by absorbing more water. Obstruction of the venous and aqueous outflow by sclerotic changes, with resulting lack of oxygen and increased production of acid, may well be a possible cause. In confirmation of these views the experiments of Martin H. Fischer are quoted by Hill. To all intents and purposes, the eye is an indistensile structure. When certain of the intra-ocular tissue elements are swollen, there must be an approximation towards a rigid system of vessels, for otherwise the circulation could not be maintained. T. Henderson has done great service in drawing attention to the conditions which control the tension of the eyeball and the circulation, but, in Hill's opinion, he has not laid stress enough on the primary cause of the œdema, which is to be found in metabolic change in the tissue. SYDNEY STEPHENSON.

III.—OCULAR TONOMETRY.

(1) **Snyder, Walter H.—The relation between general arterial sclerosis and increased tension in the eyeball.** *Ophthalmology*, July, 1911.

(2) **Polak van Gelder, Regine E. S.—Investigations with the tonometer of Schiötz. (Untersuchungen mit dem Tonometer von Schiötz.)** *Klin. Monatsbl f. Augenheilk.*, November, 1911.

(3) **Rollet and Curth.—Researches in ocular tonometry. (Récherches de tonométrie oculaire.)** *Revue Générale d'Ophtalmologie*, 30 novembre, 1911.

(1) The greater part of this article by **Snyder**, of Toledo, is devoted to a discussion of Schiötz's tonometer, and a defence of the instrument against some common objections. The *technique* of its application is described, and notes are given regarding the effects of various drugs on the ocular tension. Details of several cases are adduced, in which high ocular tension was supposed to be referable to high blood-pressure. A. J. BALLANTYNE.

(2) **Polak van Gelder**, of Amsterdam, has compared the readings of the Schiötz tonometer with direct manometric readings in the eye of the rabbit, and finds that they closely correspond.

Dealing with the clinical application of the instrument, he points out a fact which must be familiar to all users of it—namely, that repeated or continuous application for a minute or two leads to a lowering of the tension. A series of readings taken at intervals of four or five seconds show a continuously decreasing tension, but the original tension returns a minute or two after ceasing the application of the tonometer. The author glances at one or two possible explanations of this phenomenon, but adheres to the most obvious one—namely, that it is due to the filtration of fluid from the eye under the influence of the pressure exerted by the instrument. Experiments made to ascertain whether this filtration also occurred in cases of glaucoma, showed that the fall of tension was much less pronounced, or did not occur at all.

A series of measurements was also made to ascertain by what means elevation of ocular tension could be prevented during operations on the eyeball. It was found that whatever kind of speculum was used, the tension rose if the patient made attempts to close the lids. The only safeguard against rise of tension was to have the patient quiet and comfortable, and a comfortable speculum, like Clarke's, contributes to this result. A suture applied to the lower lid, so as to prevent forcible action of the orbicularis, prevents the rise of tension due to lid spasm, and help in the same direction may also be obtained from external canthotomy. A. J. BALLANTYNE.

(3) **Rollet** and **Curth**, of Lyons, have investigated the action of anæsthetics, mydriatics, myotics, and vaso-motor drugs on the ocular tension. They used the Schiötz tonometer. They give the actual results of the experiments in a limited number of cases, and refer to the thesis of Mernes for fuller details. The importance of the subject is so great that one regrets being obliged to agree with the authors when they point out that their results are evidently somewhat open to criticism. As they say, experiment of this kind is difficult. Ocular tonometry has to take account of several causes of error, such as the greater or less normal thickness of the cornea, pathological sclerosis (leucoma), the position of the eye, the state of tension or relaxation of the ocular external musculature, etc.

The following are the conclusions drawn by the authors.—Certain of the anæsthetics have no distinct action on the tension, namely, holocaine, tropacocaine, acoine. Others raise it in a direct manner, namely, eucaine B., alypine. Cocaine does not, according to the author's figures, lower the tension, but rather tends to raise it slightly. Mydriatics cause an immediate rise of tension which lasts only for a few minutes. Euphthalmine is especially prone to raise the tension; duboisine and scopolamine do so only very little. Myotics lower the tension, especially where there is glaucoma. On the normal eye pilocarpine does not lower the tension, and eserine only to a slight degree. Adrenaline, especially in inflamed eyes, sometimes causes a positive collapse of the eye.

Homatropine does not seem to have been investigated. In the body of the article, although not in the conclusions above quoted, the authors say that pilocarpine seems to be powerless as a tension reducer in cases of acute or subacute glaucoma. They have nothing to say about this drug, which is so much used by many surgeons, in other types of glaucoma.

It is to be hoped that Rollet and Curth will continue their investigations, and that others will follow suit, since the matter is one of such importance that we can hardly have too much said about it for some time to come. It is only by means of a great body of tonometric statistics that we shall reach sound conclusions. ERNEST THOMSON.

IV.—OPERATIONS.

(THIRD NOTICE.)

(1) **Abadie, Charles.—Iridectomy and sclerectomy in glaucoma. (Iridectomie et sclérectomie dans le glaucome.)** *La Clinique Ophtalmologique*, 10 juillet, 1911.

(2) **Coppez.—On a modification of the operation of Lagrange. (Use of the keratome.) [Sur une modification à l'opération de Lagrange. (Emploi du couteau lancéolaire.)]** *Archives d'Ophtalmologie*, juillet, 1911.

(3) **Lagrange.—On sclerectomy with peripheric iridic buttonhole. (De la sclérectomie avec boutonnière irienne périphérique.)** *Archives d'Ophtalmologie*, juillet, 1911.

(4) **Lagrange.—Iridectomy and sclerectomy in glaucoma. (Iridectomie et sclérectomie dans le glaucome.)** *La Clinique Ophtalmologique*, 10 septembre, 1911.

(5) **Wood, Casey A.—The operative treatment of glaucoma with special reference to the Lagrange method.** *Canadian Medical Association Journal*, November, 1911.

(6) **Kayser, B.—Three cases of glaucoma treated by trephining according to Elliot's method. (Kurze Mitteilung über drei nach der Elliotschen Methode durch Trepanation behandelte Fälle von Glaukom.)** *Klin. Monatsbl. f. Augenheilk.*, Februar, 1912.

(7) **Terson fils.—Hæmorrhagic glaucoma and anterior sclerectomy. (Glaucome hémorrhagique et sclérectomie antérieure.)** *Ann. d'Oculistique*, Februar, 1912.

(8) **Zorab, A. B.—The relief of tension in chronic glaucoma: a preliminary report on a new operation.** *Ophthalmological Society U.K.*, March 14th, 1912.

(9) **Lang, B. T.—Corneo-scleral trephining (Lieut.-Colonel R. H. Elliot's operation).** *Lancet*, April 13th, 1912.

(1) **Abadie**, of Paris, in this short article, throws the whole weight of his great experience into the scale against sclerectomy in glaucoma. He had always foreseen that sclerectomy would prove a disappointment, and that is what has happened. It must be recognized that an essentially malignant glaucoma is quite rare. More often, glaucomas which are simple and ordinary (*vulgaires*) become malignant and pernicious on account of the surgical intervention itself, and the conditions under which the intervention is practised. In the course of a long career, Abadie has performed very many iridectomies in all kinds of glaucoma, and the small proportion of failures may be divided up into two classes—namely, cases which are malignant from the first, and cases which have become so on account of some fault either on the part of Abadie himself or of his patient. We may quote the forcible language of the author:—" If one grabs several times at the iris and chews it up with the forceps, or if one pulls it too far out of the wound—incidents which may arise from loss of nerve on the part of the operator, or from bad behaviour of the patient—disagreeable results may follow. In the days which follow such operations the anterior chamber is difficult to get re-established, the lens is pushed forwards, drags on the zonule and compresses the iris against the cornea. The disease drags out in length, and the final result is often a deplorable one, whereas a simple and correctly-performed iridectomy would have brought about complete cure in a few days." Chloroform, then, should be used, when necessary, to control the patient, and the keratome should be used by preference, in order that the anterior chamber may have a chance to re-form as early as possible, so as to prevent the lens from being thrust forward. Not one of the operative conditions necessary for the cure of glaucoma—of whatever kind—by iridectomy is fulfilled in the operation of sclerectomy. On the contrary, the operation is laborious and difficult, the opening is large and gaping, the iris may be present in the wound, and requires sometimes to be rammed back or partially excised. The widely-opened anterior chamber re-forms slowly; the iris, when left in place, is compressed and pushed forward by the lens, which itself drags upon the zonule, and becomes placed in contact with the back of the cornea. From that point the disease may take a bad turn, and the eye eventually be lost. " That was what I thought and believed would happen, and that is just what has occurred. . . . . Let us keep iridectomy as the operation of choice in glaucoma, and let us apply ourselves, above all things, to make it as simple and as correct as possible." ERNEST THOMSON.

(2) To enable him to perform Lagrange's operation for glaucoma with a keratome instead of a Graefe knife, and to ensure that the scleral opening shall still be covered by conjunctiva, **Coppez**, of Brussels, has devised a method by which the conjunctival flap is cut first, and in such a way that it shall not hang down over the cornea and obscure the view of the upper part of the anterior chamber when the scleral section is being made.

The flap is cut as follows.—The conjunctiva is detached from the limbus in the upper half or two-fifths of its extent and separated from the sclera upwards for a distance of 7 mm. or 8 mm. A suture is next passed through each extremity of the freed conjunctiva, the points of exit being about 8 mm.

apart. When this is drawn tight, the stretched conjunctiva will cover about the upper fifth of the cornea, forming a good covering for the scleral opening.

Coppez holds also, with Gamo Pinto, that cystoid cicatrisation takes place better between conjunctiva and sclera that have been separated from each other than if remaining adherent. BERNARD CRIDLAND.

(3) **Lagrange**, of Bordeaux, writing on the value of the peripheric buttonhole iridectomy in association with the operation of sclerectomy for glaucoma, finds that since its introduction in 1907, for which Holth is largely responsible, a good number of the leading ophthalmologists are now adopting it, and seem agreed as to its utility.

The "buttonhole" can be made in two ways:—(1) with the knife, shaving the base of the iris; (2) with the scissors, after or before the sclerectomy.

(1) In performing it with the knife (a fine Graefe), it is necessary to introduce the blade immediately in front of the middle of the iris, and, after having made the counter-puncture and at the same moment that the scleral incision is begun, the knife is turned backwards and the base of the iris, or a portion very close to it, is sectioned; the blade is then given its original direction and the scleral section is completed.

This turn of the blade to divide the iris appears to be a rather particular movement, and is best understood when seen. It is not always successful, but no harm results from failure, for the "buttonhole" can be made afterwards by one of the methods advised by Elliot, Herbert, Holth, or the author himself.

(2) Scissor method.—When the scleral section is completed, the iris may or may not prolapse. If it prolapses it is an easy matter to seize it in its outer part and to excise a small fragment with de Wecker's or the author's own sclerectomy scissors. Lagrange thinks the excision of a fragment is, however, unnecessary, and that the perfect peripheric buttonhole is obtained by making a simple incision placed as near to the base of the iris as possible. If the iris does not prolapse, and it is still desired to make a buttonhole, it is enough to draw it out in part and incise it with the scissors.

Value of the operation.—Theoretically, the arguments in favour are:—

1. The dangers which ordinary iridectomy presents in some varieties of glaucoma.
2. The utility there is in preserving the sphincter of the iris and the ordinary action of myotics.
3. The possibility of obtaining a very good subconjunctival fistulisation without any danger of inclusion of the iris.
4. The harmlessness of the operation, no complication up to the present time having been imputed to it.

The first argument refers to that class of simple chronic glaucoma with intermittent hypertension in which there is marked field contraction towards the fixation point. An ordinary iridectomy is here contraindicated, and a simple sclerectomy all that is necessary. If, however, the iris prolapses, the peripheric buttonhole can be added, the simple incision in the iris giving exit to the aqueous which projects the iris into the wound.

Practical arguments are put forward in the shape of ten successful cases, all of which, with one exception where an acute attack complicated matters, bear testimony to the value of the buttonhole incision.

The article concludes with the following words:—"Tension raised from time to time under the influence of various causes, sometimes a simple emotion, which renders simple sclerectomy uncertain, narrowing of the visual field in a nervous subject, making iridectomy dangerous—such are the two conditions which point in preference to any other intervention to sclerectomy with peripheric iridectomy, for it saves from prolapse and does not lead to inhibition, *i.e.*, rapid loss of central vision." BERNARD CRIDLAND.

(4) This article by **Lagrange**, of Bordeaux, takes the form of a dignified, and at the same time forceful, reply to the article by Abadie on the same subject in the July number of *La Clinique Ophtalmologique* (see above). We need only suggest that the two articles be read in sequence.

ERNEST THOMSON.

(5) **Casey A. Wood,** of Chicago, in the course of an extremely readable article, deals with the surgical treatment of glaucoma, and insists that the word "glaucoma" has been applied to a dozen entirely different pathological entities. He discusses more particularly the operative treatment of two classes: 1st, those cases where any form of iridectomy or sclerotomy is inadequate to prevent glaucomatous attacks; and 2nd, those cases in which the two operations named, alone or in conjunction, sometimes actually make matters worse. In the year 1899, influenced by the arguments of de Wecker, Wood began, in the more chronic and non-congestive types of glaucoma, to combine with a wide peripheral iridectomy, excision of the sclero-corneal margin of the primary incision. In 1906, Lagrange introduced a very similar, if not, indeed, an identical, operation, the so-called "irido-sclerectomy." This operation has been performed by Wood on thirty-five eyes, but he modifies the procedure to the extent of removing all the conjunctiva attached to the corneal border of the surgical incision. His object is to delay union of the edges of the wound; to widen the bridge of loose cicatricial tissue between them; to prevent such a complete growth of the endothelium which would cover the wound and effectively block the exit of fluid; and, finally, to ensure intraocular rest. No infection has been noted, despite the exposure of the root of the iris and the ciliary body, inevitable from the modification adopted by Wood. This immunity is attributed by the author to the use, before and after the operation, of "White's ointment"—that is, a preparation of 1 : 3,000 mercuric chloride in sterile vaseline.

The conclusions reached by Wood, as to the Lagrange operation, are as follows:

1. Whatever the *modus curandi* of the operation, it is more effective in chronic glaucoma than is either simple iridectomy or sclerotomy.
2. Even the exsection of a considerable strip of sclera with the overlying conjunctiva, and the formation of a wide wound, exposing the root of the iris, is not followed by infection or other untoward results.
3. The dangers of a possible fistulous communication between the anterior chamber and the conjunctival space as a sequel of Lagrange's operation, have probably been much exaggerated.
4. It is an operation simpler and more easily done than Heine's cyclodialysis, scleral trephining, or most of the other procedures advised for the relief of chronic glaucoma.
5. In considering the conduct of a case of chronic glaucoma, the choice of a single line of procedure lies not so much with this or that operative measure as between the Lagrange operation and the intelligent use of miotics *plus* general treatment.
6. The performance of irido-sclerectomy does not exclude such post-operative measures as the use of eserine, and the exhibition of such additional systemic treatment as the individual case demands.
7. In those forms of glaucoma in which a considerable scleral exsection is indicated, iridectomy should also be done. These cases need all the drainage facilities possible, and especially that provided by the open, permeable, and permanently unhealed margins of an iridic coloboma.

SYDNEY STEPHENSON.

(6) **Kayser's** first patient had trephining performed in both eyes. The condition was chronic glaucoma. Before operation, the right eye counted fingers at three metres, the field was greatly contracted, and the tension was 60 mm. of mercury. The left eye counted fingers at one metre; there was great reduction of the field, and tension was 60 mm. The conditions five months later showed great improvement, *viz.*, in the right eye, V.=6/6, tension 8 mm. Hg., and field of vision unaltered; in the left eye, V.=fingers at six metres, tension 13 mm. Hg., and no change in the field. The other case was one of acute glaucoma, with tension of 60 mm. Hg., and V.=counting fingers at two metres. Healing was quiet, but cataract rapidly developed. The tension, however, did not rise above 15 mm., and some weeks later, an uncomplicated extraction was performed. The author thinks the operation justifies all that is claimed for it. A. J. BALLANTYNE.

(7) **Terson fils** records the case of a diabetic patient who, having previously lost the sight of his right eye from hæmorrhagic glaucoma, developed the same disease in his left eye. Treatment with pilocarpin (eserin was badly borne), leeches, drugs to lower the vascular tension, purgatives, etc., gave only temporary improvement, and so an iridectomy was performed. This reduced the tension and improved the vision, but in six months the eye was again hard and the vision was much worse. A sclerectomy was then performed which permanently lowered the tension, but in spite of this, the sight became reduced to perception of light owing to optic atrophy and lenticular opacities. The author considers that the old advice that enucleation is the only operative treatment admissible in hæmorrhagic glaucoma must be abandoned. He discusses the advantages of various operations, and suggests that, although non-perforating sclerectomy should be considered owing to its safety, its efficacy is doubtful, and the best results are likely to be obtained from sclerecto-iridectomy with a small incision. No reference is made to trephining, and although Herbert's name is mentioned, his operation is called a sclerectomy. When the eye is blind, equatorial scleral punctures of various shapes are recommended, or an equatorial sclerectomy may be performed as suggested by L. Dor. R. J. COULTER.

(8) After briefly reviewing the existing operations, **Zorab**, of Southampton, indicated that the guiding principle in each was drainage of the interior of the globe. He then went on to describe his own procedure based on the same guiding principle. He described two methods, of which the second was, in his opinion, the better. Originally, he passed a threaded needle subconjunctivally into the anterior chamber, piercing the sclerotic coat at the angle. The needle was then brought out at a corresponding point through the angle, and out again subconjunctivally. The ends of the silk were cut short, and a little manipulation ensured their being covered by conjunctiva. He found, however, that the conjunctiva was very frequently torn by the fixation forceps, and also there was some risk of pricking the iris and lens capsule with the point of the needle. Acting on the suggestion of J. F. Bullar, he modified the operation thus:—a large flap of conjunctiva was raised—at the upper part of the globe for choice—leaving a crescentic attachment along the limbus. A small incision was then made under this flap into the anterior chamber. A piece of sterile silk thread, about one-third of an inch long, was doubled on itself, and the loop was pushed gently through the sclerotic incision into the chamber. The conjunctival flap was then replaced and stitched in a couple of places, great care being taken to see that the distal ends of the bight of silk did not come near the margin of the conjunctival incision. Zorab claimed for this procedure that it was quite devoid of manipulative risk, that it established efficient drainage, which promised to be permanent, and that it

was simple to perform. The only danger, in his opinion, was from sepsis, but he did not regard this as being any greater than in other operations which involved opening the eye-ball. The greatest emphasis was laid on ensuring a complete covering of the silk by healthy conjunctiva. As the oldest case only dated back to July, 1911, he was careful to state that the operation was only on trial, but he was firmly convinced that it held out good promise. He had so far restricted it to cases of chronic glaucoma, as acute cases did well with iridectomy. He concluded his paper with notes of the cases already operated on.

Stephen Mayou, of London, mentioned some cases on which he had tried a similar procedure somewhat before Zorab.

(9) **B. T. Lang**, of London, has spent some time in Madras, India, studying Elliot's operation of trephining the corneo-sclera in cases of glaucoma. He now describes very clearly the Madras *technique*, and makes one or two suggestions as follows:—(1) In dissecting the conjunctival flap from the sclera, especially when the two structures are more or less adherent, he employs a Desmarres' secondary cataract knife, modified by having the whole of its blunt end sharpened; (2) he has devised a protected trephine of convenient pattern, which is made by Messrs. Weiss, of London.

SYDNEY STEPHENSON.

V.—INSTRUMENT.

Fox, L. Webster.—A modified trephine for the Fergus-Elliot operation in glaucoma. *Ophthalmic Record*, December, 1911.

Fox, of Philadelphia, describes a modification of the blades for von Hippel's trephine for use in glaucoma operations, and refers to a similar adaptation made by Nimmo Walker, of Liverpool. J. JAMESON EVANS.

VI.—MISCELLANEOUS COMMUNICATIONS DEALING WITH GLAUCOMA.

(1) **Sommer, G.—On the pathology of glaucoma and epilepsy of the pupil. (A preliminary communication.)** *Wochenschrift f. Therapie u. Hygiene des Auges*, No. 18, 1909.

(2) **Thompson, A. Hugh.—Primary glaucoma in young patients.** *Ophthalmic Review*, June 19th, 1909.

(3) **Maher, Odillo.—On the treatment and prognosis of primary glaucoma.** *Ophth. Review*, July, 1909.

(4) **Erdmann, P.—Glaucomatous tension in keratitis disciformis and, herpes-like diseases of the cornea. (Glaukomatöse Drucksteigerung bei Keratitis disciformis und herpesartigen Hornhauterkrankungen.)** *Zeitschrift für Augenheilkunde*, Juli, 1909.

(5) **Haab, O.—The diagnosis and treatment of glaucoma. (Diagnose und Behandlung des Glaukoms.)** *Deutsch. med. Wochensch.*, 1910, No. 1.

(6) **Ischreyt, G.—On a precursor of "primary" glaucoma. (Ueber eine Vorsterfe des "primären" Glaukoms.)** *Klin. Monatsbl. f. Augenheilkunde*, August, 1910.

(7) **Tomlinson, J. H.—Glaucoma in a youth, aged 22 years.** *Trans. Ophthal. Society U.K.*, Vol. XXX, Fasc, 3, p. 197, 1910.

(8) **Axenfeld.**—On retrogression of glaucomatous excavation. (Ueber Rückbildung der glaucomtösen Exkavation.) *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1910.

(9) **Walter, O.**—On the question of the operative treatment of glaucoma hæmorrhagicum. (Zur Kasuistik der operativen Behandlung des Glaucoma hæmorrhagicum.) *Wochenschrift f. Therapie u. Hygiene des Auges*, 22 Dezember, 1910.

(10) **Bradburne, A. A.**—Incipient glaucoma: its diagnosis and treatment. *Ophthalmology*, April, 1911.

(11) **La Couedic.**—Notes on a case of glaucoma. *La Clinique Ophtalmologique*, 10 avril, 1911.

(12) **Marquez.**—The treatment of glaucoma. (Tratamiento del glaucoma.) *Archivos de Oftalmologia Hispano-Americanos*, Abril, Junio, Augústo, 1911.

(13) **Story, J. B.**—Glaucoma in myopia. *Ophth. Review*, August, 1911.

(14) **Bradburne, A. Alison.**—The diagnosis and treatment of simple glaucoma. *Medical Press and Circular*, August 30th, 1911.

(15) **Fleischer.**—On a case of glaucoma simplex anatomically examined (both eyes), with Schnabel's cavernous atrophy. (Ueber einer Fall von Glaucoma simplex, doppelseitig anatomische untersucht, mit Schnabelschen Kavernen.) *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1911, S. 11.

(1) **Sommer** had the opportunity of observing a patient taking an attack of epileptic convulsions while examining one of the eyes which was under eserine for glaucoma. Prior to the attack, the pupil was minimal in size; but with it the pupils became enlarged to their maximum, the glaucomatous eye being equal to the other, and both pupils did not react to light. There was no alteration in the tension. Both pupils remained moderately wide for a considerable time; and gradually returned to the previous condition, the eye under eserine reaching the minimum again. No explanation is offered of the phenomenon. W. B. INGLIS POLLOCK.

(2) **A. H. Thompson,** of London, gives notes of five cases of glaucoma in patients between the ages of 15 and 33 years. He calls attention to certain features.—1. The anterior chambers were not shallow, but in one case were unusually deep. 2. The glaucoma was chronic without much pain. 3. Cupping of the discs was well-marked in four. 4. Two cases were kept under observation, and the effect of operation has been good.

The following is of interest.—A girl, aged 11 years, was ordered glasses for hypermetropic astigmatism. Five years later, she complained of coloured lights, and was found to have T.+1 in both; there was no cupping. Eserine was used for six months, and then the tension remained normal without treatment, and had contiuued to do so when the patient was seen two years later. A. H. PAYAN DAWNAY.

(3) Iridectomy fails in those cases where the filtration angle is not opened, and for such a cystoid cicatrix should be produced. **Maher**, of Sydney, N.S.W., makes a scleral section and engages a loop of iris in the wound; this is left prolapsed for a week, and is then snipped off at each end. Sometimes at the first operation he divides the iris and leaves it prolapsed for a week, and then nips it off flush. He has had satisfactory results, and states that infection or sympathetic ophthalmia is rare in his experience.

A. H. PAYAN DAWNAY.

(4) According to **Erdmann**, of Rostock, it is quite unusual for keratitis disciformis (a disease described by Fuchs) to be complicated by glaucoma.

The author adds three more examples to those already recorded. The first two were cured by paracentesis. In the last, glaucoma supervened after instillations of scopolamine, and was cured by eserine.

T. HARRISON BUTLER.

(5) This clinical lecture by **Haab**, of Zürich, puts the whole question of glaucoma very clearly from the standpoint of the student. The general trend of opinion in Germany seems to be against operating in glaucoma simplex until myotics have had a thorough trial Haab, in sympathy with these views, points out the great value of pilocarpine, which can be used regularly for years without harm. If myotics contract the pupil, the glaucomatous process can generally be held in check. He strongly condemns iridectomy in glaucoma simplex and prefers sclerotomy. At one time de Wecker's sclerotomy found no adherents in Germany, principally because it had originated in France. Now it has been advocated by Römer, and here again by Haab. The author is content to let time prove the value of cyclo-dialysis and sclerotomy. In discussing the differential diagnosis between glaucoma and iritis, he says that the presence of tension is decisive. This appears to be rather begging the question. In many cases nothing is more difficult to decide than whether a given case is suffering from iritis with secondary glaucoma, or glaucoma complicated by iritis. When a case has been neglected, perhaps treated with atropine, the difficulty may be almost insuperable. T. HARRISON BUTLER.

(6) **Ischreyt** examined, microscopically, an apparently normal eye from a man, aged 61 years, and found the changes that were considered by Knies to lead to glaucoma, and to which he gave the name of "irido-cyclitis anterior adhæsina." The tissues forming the angle of filtration and veins springing from the ciliary plexus, showed round cell infiltration, the spaces of Fontana were blocked with cellular elements and pigmentary granules, and there was proliferation of the endothelium of Descemet's membrane. The root of the iris approached in some places the ligamentum pectinatum, this being evidently the first stage in the formation of adhesions. Ischreyt holds that these inflammatory changes were caused by unknown irritant substances, which collect at, and leave the eye through, the angle of filtration.

C. MARKUS.

(8) **Axenfeld**, of Freiburg, points out that it is by no means rare to find that immediately after an operation to reduce tension, a glaucomatous cup has become shallower. This is especially the case in the not uncommon condition of post-operative detachment of the choroid. The cup, after a very short time, generally returns to its former depth. To detect the change, it is necessary to use the ophthalmoscope much earlier than is usual, and careful sketches must be made. The drawings which accompany the paper show very clearly the change swhich take place. T. HARRISON BUTLER.

(9) **Walter**, of Odessa, after a short introduction on the difference of opinion held as to whether glaucoma hæmorrhagicum is a primary or secondary form, gives an account of a serious case.—The patient, a woman, 63 years of age, stated that the vision of both eyes had been failing for a year, and that the acute pains in the left were of two weeks' duration This eye presented the appearance of inflammatory glaucoma, with opacity of the media, and vision equal to fingers at ½ m. The right eye had numerous hæmorrhages in the retina, but the tension was normal, and vision fingers at 4 m. Enucleation of the left had already been proposed by another surgeon, eserine having failed to reduce tension. Sclerotomy, followed by iridectomy, gave relief to the pain; the congestion subsided, and the media cleared. Examination then discovered numerous hæmorrhages in the retina, with diseased vessels, and atrophic optic nerve, a condition similar to that which

had been found in the other eye, and which seemed to confirm Schmidt-Rimpler's view of the glaucoma being secondary to the hæmorrhages. A recurrence of the pain and congestion was relieved by a second iridectomy. Gradual atrophy of the optic nerve followed, and led to diminished vision. The right eye was later attacked by glaucoma, but the patient declined operation, and the vision greatly decreased. W. B. INGLIS POLLOCK.

(10) This paper by **Bradburne**, of Southport, deals briefly but systematically with the whole subject of the diagnosis and treatment of incipient glaucoma. He points out the difficulties of diagnosis before the disease is well established, and insists on the importance of a knowledge of the prodromata, and of the effects of transient or continued elevation of pressure on the different parts of the eye. Speaking of the early evidence of cupping of the disc, he lays stress on the value of estimating the width, rather than the depth, of the excavation. Under medicinal treatment, he recommends, in addition to regulation of food, etc., myotics alone or combined with dionine, cold applications, and instillation of a one or two per cent. solution of citrate of sodium. Massage is also recommended. The operation which he favours is a small peripheral iridectomy. Several plates are appended to the article. A. J. BALLANTYNE.

(11) In this case, by **Le Couedic**, of Guingamp, double glaucoma occurred in an arterio-sclerotic woman of 48 years. The interesting point was that the type of glaucoma was not the same in each eye. That in the right eye was secondary to a previous iritis—eight years ago. It was of subacute inflammatory, irritative type. In the left eye there was simple chronic glaucoma with intermittent hypertension. "In order to interpret the pathogenesis of a syndrome so complicated and varying as that of glaucoma, one has to be eclectic in the choice of theories. To make a special use of an old aphorism, there is no such thing as glaucoma, there are only glaucomatous people. The particular character of a glaucoma depends upon the individual and not upon the cause." ERNEST THOMSON.

(12) In this long paper, **Marquez** adopts an attitude towards glaucoma, which is in essentials different from that adopted by the majority of ophthalmic surgeons. In this view, increase of intra-ocular tension is not a necessary part of glaucoma, but the chief factor is supposed to be a diminution of the resisting power of the coats of the globe. For him the cupping of the disc is not the result of hypertension, but an independent, although simultaneous, process. The real primary change is an inflammation of the nerve head; he quotes Bitzos as saying that "of all the symptoms and of all the lesions which are observed in cases of primary glaucoma, the first to present itself and the most constant, which shows the fundamental change in primary glaucoma, is glaucomatous papillitis." Whether these changes are the result of vascular disease, is uncertain; but the occurrence of cases in which the excavation of the disc is accompanied by no increase of tension, show to Marquez's mind, that at least we must rid ourselves of the conception of glaucoma as being solely hypertension, and we shall more easily obtain a proper comprehension of the subject "if we suppose that the alterations of the papilla (even without cupping, as in some cases of fulminating glaucoma, or with cupping only of the lamina cribrosa, as Axenfeld has shown) are the fundamental changes which are never wanting, and the increase of tension a very frequent, but an accidental, complication." HAROLD GRIMSDALE.

(13) **Story**, of Dublin, reports two cases of simple chronic glaucoma, both males, aged 55 years, with in one 9 D. and in the other 4·5 D. of myopia. Both were subjected to the operation of iridectomy with satisfactory results.
A. H. PAYAN DAWNAY.

(14) In the early diagnosis of glaucoma, **Bradburne**, of Southport, lays

stress upon the employment of Bjerrum's method, which he carries out in the following simple way.—The patient, who is seated at a distance of forty inches from a blackboard or piece of dark velvet or cloth, fixes one eye upon a white-headed pin, inserted through the centre of the screen. A small white glass bead is tied to a length of black thread, so as to form an endless loop, and one end of the loop is passed over the pin in the screen, its other end being placed over the surgeon's finger. It now becomes a simple matter to fix the white bead at this or that distance from the central pin, while by moving the hand in a circular direction, the white bead can be used to explore the various parts of the visual field. A defect will be evidenced by blurring or disappearance of the white bead.

In selected cases, Bradburne advises the removal of a small portion of the base of the iris, employing for the iridectomy only a small scleral wound.

SYDNEY STEPHENSON.

(15) When a theory is almost universally and blindly accepted, the time is ripe to review it critically. Into this category, says **Fleischer,** of Tübingen, we can surely place the curious fancy that excavation of the optic nerve is due solely to increased intra-ocular pressure. The severe pressure of acute glaucoma invariably fails to produce excavation, whereas in chronic glaucoma simplex, where the tension is normal or almost imperceptibly raised, a cupped disc is the rule. A cupped disc, indistinguishable from that found in absolute glaucoma, appears after poisoning with methyl alcohol, and Schnabel saw a deep cup appear in fourteen days in a case under constant observation after an iridectomy and where the tension, carefully estimated by the tonometer, remained absolutely normal. And yet, year after year, the same hoary theory is repeated parrot-like in almost every lecture theatre in almost every clinic! Yet Schnabel, Elschnig, and others have pointed out that there is in glaucoma simplex a condition of the optic nerve which is quite pathognomonic of the condition, a peculiar special form of atrophy characterised by cavern formation—a cavernous atrophy. It is true that Thomson Henderson has attempted to show that cavernous atrophy is a mere optical delusion, the result of oblique sectioning. Such apparent spaces as he describes in his book are so caused, but it is not of such that Schnabel speaks.

The present communication confirms all that Schnabel claimed. Fleischer was able to possess himself of both eyes from a patient with glaucoma simplex who died of an infarct in the lung. He found in the left eye that there was glaucomatous excavation of the papilla with recession of the lamina scleralis. A nasal sector of nervous tissue remained undestroyed, and this sector showed well-developed cavern formation. The remaining empty part of the papilla showed large caverns. On the right side there was a central physiological cup of large size with steep sides. That part of the nerve which lay in front of the lamina showed early cavern formation. The lamina was in its normal position, and behind it again cavernous atrophy was commencing. The author lays stress upon the fact that cavern formation was present in the right optic nerve, although it was clinically regarded as normal, and there was neither a glaucomatous cup nor displacement of the lamina cribrosa. In other words, the glaucomatous change had already started in the right eye, and *the first histological sign was, not recession of the lamina scleralis, but cavern formation both before and behind the lamina.*

In the discussion **Elschnig**, of Prague, said that he felt that in some way, either by pressure upon the large ganglion cells of the retina, or upon the nerve fibres, or by causing an increased lymph pressure, the increased intraocular tension was a factor in the development of this form of atrophy.

T. HARRISON BUTLER.

BOOK NOTICES.

The Prescribing of Spectacles. By ARCHIBALD STANLEY PERCIVAL, M.A., M.B., B.C. Cantab., Senior Surgeon, Northumberland and Durham Eye Infirmary. Second Edition, Revised. Bristol: John Wright and Sons, Ltd. 1912. Price 5s. 6d. Net.

It is such a short time since the first edition of this book was reviewed in these columns (December, 1910), that we may be excused if we are content to welcome the second (revised) edition on behalf of those for whom the work is obviously intended (namely, practising ophthalmologists, not beginners), without very much comment.

In this revised edition a number of new paragraphs and two tables have been added. Some ten pages altogether have been added to the book, which in essentials remains as before. The chapter on convergence has been simplified by the adoption of centrads throughout. Errors, unavoidable in a first edition, have been eliminated, although we still find *primosphores* for *primospheres* (p. 109). Finally, we may say that the book, while actually larger in content than the first edition, is two ounces lighter in weight through the employment of thinner paper. ERNEST THOMSON.

Traitement Adjuvant du Strabisme. By F. TERRIEN and HUBERT. Paris: G. Steinheil. Price, 4 francs. 1912.

"This book is not a treatise. We have merely endeavoured to condense into one little volume the methods to employ in the orthoptic treatment of squint." "These lectures . . . will be, we believe, indispensable to parents, who will find there the rules to follow in order to direct the visual exercises of their children. They will also be of service to a practitioner who may be called upon to prescribe these exercises."

A perusal of the volume shows that the authors have amply justified the claim thus made in the preface. This series of lectures, delivered at the Hospital for Sick Children in Paris, should not only be of assistance in carrying out the orthoptic treatment of squint, but may well serve as a model to those who may be called upon to lecture upon the subject.

More than one-third of the book consists of an admirably written account of the use of Rémy's diploscope. Most of the remaining pages are devoted to descriptions of other methods of training the fusion sense. These bear the stamp of practical familiarity. The few pages dealing with the general treatment of squint are scarcely worthy of the rest of the book. Although there is evidence that modern works on the subject have been consulted, the information derived therefrom does not appear to have been carefully considered. For instance, the authors have given the directions for curing amblyopia ex anopsia by atropising the fixing eye only, or by occluding the fixing eye, as well as the warning against using atropine for both eyes for prolonged periods, but they do not say when atropisation will suffice and when occlusion will be required. The statement is made that occlusion cannot be employed before the age of two years! A child who developed a constant unilateral squint in early infancy and who at the age of one year is found to have lost the power of fixation in the deviating eye will probably recover his sight if the fixing eye be promptly and continuously occluded, but if this case be left until the age of two years, the blindness will almost certainly be incurable. There is a warning of the serious constitutional symptoms which sometimes follow the instillation of atropine sulphate drops, but no mention is made of the far safer and equally efficient atropine ointment. The authors do not attempt to correct errors of refraction until after the age of three years.

The book is to be recommended as an excellent guide to fusion training.

CLAUD WORTH.

Developpement de l'Organe de la Vision et Anatomie du Globe de l'Œil.

A. DRUAULT. Paris: Masson et Cie. 1912.

This work forms part of Tome V. of the New Edition (the third) of Poirier's *Traité d'Anatomie Humaine*, now edited by Charpy & Nicolas, and published by Masson et Cie., Paris, 1911, in separately obtainable volumes (25 francs).

The present part—fully maintaining the character of Poirier's *Anatomie* as being one of the most detailed text-books—extends to 260 pages, illustrated by nearly 200 figures, the majority of which are borrowed from the latest works on the subject. Many of these figures are printed in colours, possessing that delicacy of tint which is typical of these volumes; others are reproductions demonstrating the more recent advances in the study of development by means of reconstructed models. Each section is followed by a brief account from the view of comparative anatomy, and by a copious bibliography embracing particularly the latest contributions to the knowledge of the subject. The diverse views of writers on controversial points are stated and compared in a lucid and readable manner, whilst the addition of the name of the authority and date of his publication increases the interest and weight of the facts given.

Although this full and critical treatment may render somewhat formidable the task of the student who approaches the subject for the first time, yet the arrangement of the subject matter and the clearness of expression make the description most easy to follow. As an example of this may be cited the introduction to the study of the retina (p. 456).

On the other hand, for those who seek a detailed description and a *résumé* of the latest investigations on the development and minute anatomy of the eye, the book will be of the greatest value. Thus, in the description of the equator of the lens, it is stated (p. 512) that:—

"*L'équateur du cristallin n'est pas régulierèment lisse. Il montre une série d'élevures et de dépressions qui ont été signalées par divers auteurs, notamment par Hess (1895, 1905) Rahl (1900) Wolfrum (1908) et décrites par Terrien (1907). Sur le cristallin examiné latéralement, les élevures se montrent allongées dans la direction méridienne, s'avançant par consequent un peu sur chaque face. Telles que Rahl les figure, elles auraient une longueur moyenne de 1 mm. 4. Elles sont inégales en hauteur et en largeur. On les observe aussi bien sur le vivant (en cas d'iridectomie, de colobome irien) que sur les pièces anatomiques. Leur nombre est sensiblement le même que celui des procès ciliaires et elles sont manifestement produites par la traction des faisceaux zonulaires sur les points de la capsule où ils prennent insertion. D'après Terrien, elles sont plus marquées chez l'hypermétrope que chez le myope. Pour Hess, elles sont souvent plus nettes dans l'œil atropinisé que dans l'œil ésérinisé, et elles n'existent pas encore chez le nouveau-né. Suivant Terrien, les élevures sont situées, chez l'homme, en regard des vallées ciliaires. Pour Wolfrum, elles sont au contraire en regard desprocès ciliaires.*

The review of the literature is brought down towards the end of 1910, as instanced by an abstract of Professor Arthur Thomson's paper on the anatomy of the filtration angle, which appeared in THE OPHTHALMOSCOPE of September, 1910. From the great frequency with which there appear in the text the names of authors who have written within the last decade, one can realise the vast amount of research that has been done in this subject during that period. The exhaustive work of Seefelder and Magitot (1910) on the development of the eye as studied in a large series of human embryos of all ages is especially noted. Interesting accounts of experiments on the regeneration of the optic vesicles and lens are given. But apart from work in the comparatively recent study of development (in connection with which it may be mentioned that the number of pages devoted to this part of the subject has increased from 18 in the last edition of 1901 to 118 in the present), as regards the actual structure of the globe of the eye, the ophthalmologist will acknowledge that in his domain at least anatomy can still make new contributions, and the investigator is not gleaning in a barren and useless field. All the more essential, therefore, does a complete and modern work such as M. Druault's become, both to the ophthalmologist requiring a clearly-expressed but detailed description of the present state of knowledge of the subject which his special province embraces, and also to the anatomist who would learn the views and progress of others who have ventured into so fascinating and productive a branch of research.

Two features of the book, or rather, their absence, may be complained of. In the first place, as in most Continental works, there is no index, nor in this volume is there even a *Table des Matières*, although the order of the subject matter is so well planned that the omission is not a serious one. In the second place, unlike the previous volume of this edition of the *Traité d'Anatomie* which has appeared, the B. N. A. nomenclature is not adopted, and even such synonyms as are given are translated into French.

S. E. WHITNALL.

CORRESPONDENCE.

[While THE OPHTHALMOSCOPE will at all times welcome correspondence from its readers, the Editor does not hold himself responsible for any views expressed in this column.]

XEROSIS WITH TRANSPOSITION OF THE RED AND GREEN FIELDS.

To the Editor of THE OPHTHALMOSCOPE.

SIR,

I regard Mr. Sydney Stephenson's observation of the transposition of the red and green fields in xerosis as of great importance. It is one which I theoretically anticipated from my point of view. All the facts point to the conclusion that there are two definite physiological processes in the retina, one corresponding to the photo-chemical decomposition of the fluid surrounding the cones which has been sensitised by the visual purple, and the other to the stimulation of the ends of the cones by the decomposition products. Though red light is not nearly so active in bleaching the visual purple as green, when it does produce an effect at all its action is greater. Mr. Stephenson says that xerosis is always accompanied by signs of torpor retinæ, if not actual hemeralopia, therefore we should expect that the action of red would be more affected than that of green. It would be of great advantage if perimetric observations could be taken with spectral colours of similar luminosity.

I am, etc.,

F. W. EDRIDGE-GREEN.

LONDON,
March 26th, 1912.

NYSTAGMUS IN MINERS.

To the Editor of THE OPHTHALMOSCOPE.

Sir,—In the March number of THE OPHTHALMOSCOPE, Mr. Harrison Butler, in reviewing Dr. Tomlin's thesis on coal miners' nystagmus, writes that hemeralopia is a very important symptom, and is present in 60 per cent. of patients suffering from this disease. If he means by hemeralopia that the patients see proportionately worse at night than in daylight, with all due respect, I beg to differ from him in this opinion. In almost every case the patients I have seen tell the same story—that when walking along the roadway to his work the lamps carried by the men in front seem to revolve, he becomes giddy and cannot find his bearing accurately, and his vision fails somewhat. When he gets to the place where his work is and proceeds to work by the light of his own lamp only, the giddiness, loss of vision, and revolution of objects before him, become very much less, and until he starts for the pit bottom again he is in comparative comfort. On emerging from the cage into the open air, the trouble recommences. After daylight the patient can see quite well until he comes within the sphere of artificial light, *e.g.*, a street lamp, which at once starts up all his symptoms, which have not ceased by the time he reaches the next lamp. In the open country, with a steady light from moon or stars, allowing for the difference in the intensity of light, there is no loss of vision. I believe that the change in the light is the exciting factor to the symptoms when nystagmus is once established. I have never found hemeralopia in a case of coal miners' nystagmus unless from some other cause.

Yours truly,

S. MCMURRAY, M.B., F.R.C.S.E.

3, BROOK STREET,
STOKE-UPON-TRENT.
March 17th, 1912.

To the Editor of THE OPHTHALMOSCOPE,

SIR,—The question brought forward by Mr. McMurray is an interesting one. Is there any real *hemeralopia* in the disease known as miners' nystagmus? Romiée states that among several thousand cases of nystagmus he has not found a single one who had any hemeralopia. Court, on the other hand, found that it was a symptom in 127 cases out of 164. My own experience is that the correct figure is to be found between Romiée's and Court's.

I have invariably carefully excluded the influence of lamps. I always ask my miner patients, "How do you see if you go out into the country where there are no lamps?" Quite a large proportion are quite certain that they see very badly in a dim illumination, quite apart from the dazzling effect of any lights. They are also clear that this true night-blindness did not exist before nystagmus came on.

The correct solution of the problem is to be sought by carefully testing these men with a photometer such as Foerster's.

Yours truly,
T. HARRISON BUTLER.

26, ADELAIDE ROAD,
LEAMINGTON,
March, 1912.

"THE OPHTHALMOSCOPE" DIARY.

May, 1912.

6th—9th. At 184, Faubourg Saint-Germain, Paris, French Ophthalmological Society.

11th. At Dublin, at the theatre of the Royal Dublin Society, at 10 o'clock a.m., Extra-Metropolitan meeting of the Ophthalmological Society U.K.

June.

4th. At Cheltenham, Midland Ophthalmological Society.

13th. Ophthalmological Society U.K.

July.

11th. Ophthalmological Society U.K. (Annual General Meeting).

18th—19th. At Keble College, Oxford, Oxford Ophthalmological Congress.

24th—26th. At Liverpool, the annual meeting of the British Medical Association, Section of Ophthalmology.

August.

3rd—5th. At Heidelberg, Ophthalmologische Gesellschaft.

20th—22nd. At Niagara Falls, Ontario, the American Academy of Ophthalmology and Oto-Laryngology.

NOTES AND ECHOES.

Deaths.

WE regret to announce the death, at the age of 74 years, of Max Mandelstamm, director of the ophthalmic klinik at Kieff. He studied under von Graefe, in Berlin, and Helmholtz, in Heidelberg. The fact that he was a Hebrew sadly interfered with his official progress, although it did not prevent his attaining a most extensive private practice.

William Henry Folker, F.R.C.S., consulting surgeon to the North Staffordshire Infirmary, Hartshill, Stoke-on-Trent, died on March the 26th last at the advanced age of 86 years. He founded the eye department at the North Staffordshire Infirmary, and held the post of ophthalmic surgeon for two years. Although never a specialist, pure and simple, he did much eye work in his earlier days, and retained his interest in the subject to the last. His son, Mr. Herbert H. Folker, holds the appointment of ophthalmic surgeon to the North Staffordshire Infirmary.

* * * *

Appointments.

Dr. F. SCHIECK, of Göttingen, has been appointed professor of ophthalmology in Königsberg, in succession to Dr. Krückmann, who, as already announced, has accepted the Berlin appointment.

Dr. Pietro Biardi, of Genoa, has been appointed to the chair of ophthalmology in Turin.

Dr. O. Lescher has been nominated *privat-dozent* of ophthalmology in the Bohemian University of Prague.

Mr. T. E. Ashdown Carr has been appointed ophthalmic surgeon to the Derbyshire County Council (Education Committee).

* * * *

International Congress of Medicine.

IN response to the invitation sent to them by the organizing committee of the Seventeenth International Congress of Medicine, the Canadian National Committee has appointed Dr. R. A. Reeve a vice-president of the section of ophthalmology and Dr. J. W. Stirling a member of the Council.

* * * *

International Trachoma Prize.

BY the Hungarian Minister of the Interior a prize of the value of 1,000 crowns is announced for the best work dealing with the ætiology of trachoma. The essential condition is that the work submitted, which may be in English, French, German, or Hungarian, shall show evidence of material progress. Works that have already been published for the first time during the years 1909, 1910, 1911, or 1912, are eligible. Theses must be sent in at the latest by December 12th, 1912, addressed to Hofrat Dr. Emil v. Grósz, Budapest. The decision of the jury, which will be appointed by the Minister of the Interior, will be announced at the Seventeenth International Congress of Medicine, to be held in London in 1913.

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Erratum.

"Notes from an Indian Eye Clinic," April, 1912. Paragraph 11, line 4, for "these mean, native Tamils" read "these men, native Tamils."

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THE

OPHTHALMOSCOPE.

A MONTHLY REVIEW OF CURRENT OPHTHALMOLOGY.

VOL. X.—NO. 6.] *JUNE 1, 1912.* [TWO SHILLINGS.

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ORIGINAL COMMUNICATIONS

IRITIS.*

BY

ARTHUR W. ORMOND, F.R.C.S.

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It is doubtful if iritis as a simple distinct entity exists. Friedenwald in 1896 stated that cyclitic dots could be discovered in every case of iritis if only one looked for them with sufficiently high magnification, and Fuchs gives the weight of his great experience in favour of a general inflammation of the uveal tract, rather than a local and distinct inflammation of the iris. It is, I think, generally acknowledged that iritis of any severity necessitates also the existence of cyclitis as well, and in the remarks I now offer I would suggest your bearing that fact in mind.

Anatomy and Physiology.

The iris consists of a stroma composed of delicate connective tissue, lined on its anterior surface by a continuation of the endothelium which covers the posterior surface of the cornea, and on its posterior surface by two layers of pigmented epithelium. With regard to this statement, Thomson Henderson denies the existence of an endothelial layer on the anterior surface of the iris, and states that the flattened cells forming the so-called anterior endothelium are only the superficial layers of cells of the anterior limiting membrane, which latter is but a condensed stratum of the connective tissue forming the iris stroma. The anterior of the two pigmented layers is an extension of a similar layer ot cells lining the ciliary processes, and is the continuation forwards of the pigmentary layer of the retina. The posterior pigmented layer, which is continuous with a similar non-pigmented layer, covering the ciliary processes, represents the pars ciliaris retinæ. These two layers of pigment cells fuse at the pupillary margin, and so correspond to the mouth of the secondary optic vesicle. The delicate connective tissue stroma forms the pars choroidalis, and, like the stroma of the choroid, contains branching pigment cells. In the stroma, at the pupillary margin, nearer its posterior surface than its anterior, is the ring of unstriped muscle, the sphincter iridis. The posterior limiting membrane of the stroma, corresponding to Bruch's membrane, has within and on it some radial fibres of unstriped muscle forming the dilatator iridis, and is placed immediately anterior to the pigment layers. There are gaps in the endothelium of the anterior surface which form the mouths of crypts, leading down into the substance of the iris; these crypts have been investigated by Fuchs, and form the anatomical basis by which Thomson Henderson explains the reason why in glaucoma an iridectomy is valuable, and alterations of arterial or venous pressure are compensated for.

The two long ciliary and the anterior ciliary arteries (6-8) break up into numerous branches which anastomose in the ciliary body to form the circulus iridis major, its exact position being just in front of the circular portion of the ciliary muscle; from this circle vessels converge radially towards the pupil. Close to the pupillary margin they again break up into a meshwork of anastomoses (circulus iridis minor) from which vessels pass to supply the sphincter pupillæ and the margin of the pupil. The veins of the iris follow the arrangement of the arteries and some small branches leave the eye accompanying the anterior ciliary vessels; on the other hand, however, most of the venous blood leaves the eye by the anterior branches of the venæ vorticosæ. The numerical relationship of the arteries and veins in the anterior uveal tissue is at present a matter of controversy; what have been looked upon as arteries being in some cases veins. I have adhered to the older teaching, whilst indicating the contentions of its opponents.

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* A lecture delivered in the course for the Diploma in Ophthalmology in the University of Oxford, May 4th, 1911.

There are no typical lymphatics, the iris being suspended in a lymph bath, *viz.*, the anterior chamber.

The nerves, derived from the nasal branch of the ophthalmic division of the fifth nerve and from the ciliary ganglion, arise from a plexus of fibres found in the ciliary body, and passing forwards follow the course of the vessels to the pupil, breaking up into terminal branches to supply the blood vessels and the sphincter pupillæ.

The iris acts as a diaphragm controlling the amount of light and also preventing marginal rays from entering the eye; it is nearly impenetrable to light, and by its reflex movement accommodates itself spontaneously to the illumination; it is also very largely concerned in the absorption of the aqueous humour, which function is facilitated by the crypts on its anterior surface. Fuchs states that these crypts form apertures which lead into the interior of the tissue of the iris and place its tissue spaces in free communication with the cavity of the anterior chamber; this arrangement favours the rapid change in volume of the iris in the alternating movements of the pupil, since it enables fluid to pass rapidly from the tissue of the iris into the anterior chamber and *vice versa.* Henderson uses this fact to explain the balance of tension in cases of sclerosis of the canal of Schlemm where tension does not rise, the aqueous leaving the eye by the veins surrounding the iris crypts.

Whether its posterior surface takes part in the secretion of aqueous is neither proved nor conclusively disproved. It seems on *a priori* grounds to be probable, but it can only be so to a slight extent, the epithelial cells being similar to those covering the ciliary body, but, of course, they cover a very much smaller area.

Pathology.

The pathological changes found in iritis are due to enlargement of the vessels both in calibre and length, displacement of the endothelium by a fibrinous exudate which permeates the iris stroma like a sponge, and often overflows into the anterior chamber and pupil, increased leucocytosis, and in some cases hæmorrhage, especially in septic iritis. The cells present in the exudate are lymphocytes, polymorphonuclear leucocytes, and mast cells.

Symptoms.

The symptoms of iritis are well known. They are pain, photophobia, and lacrymation, redness of the eye, discolouration of the iris, impaired mobility and contraction of the pupil and exudation. Pain is not always present, and is sometimes quite slight. It may, however, be very severe and then it affects not only the eye but radiates to the forehead, temple, and teeth, parts supplied by the fifth cranial nerve. Sometimes iritis is ushered in by a sharp pain, as if a foreign body were in the eye, and care must be taken if this symptom is complained of and no foreign body is found. The pain is always worse at night.

Photophobia or intolerance of light may be marked; this symptom is of great interest and displays its presence by blepharospasm. Why should an inflamed eye exhibit this phenomenon, which is due to a reflex stimulation of the fifth nerve endings?

The blepharospasm may be accounted for by supposing an excitation of the ending of the fifth nerve in the iris, which might possibly be due to light, but more probably to the constriction of the sphincter muscle and the inflamed condition of the tissues. The same cause, namely, reflex stimulation of the over-sensitive fifth nerve endings, explains the lacrymation.

The redness of the eye in iritis is marked by two characteristics: first, it increases in intensity the nearer it is to the cornea; and, secondly, it is of a much deeper red, having more blue in it than in conjunctivitis. At a distance of 4-6 mm. from the corneo-scleral margin, the anterior ciliary arteries perforate the sclerotic, and pass in to supply the ciliary body and iris, and just before they disappear they give off a minute branch which does not perforate but passes forward to the ciliary margin. It is the engorgement of these vessels which constitutes the so-called "ciliary" or "circumcorneal" injection.

The immobility of the iris is due to the congestion of the vessels, the tonic contraction of the sphincter iridis, and to the engorgement of the iris stroma by exudation, and is irrespective of any mechanical adhesion of the iris to the lens. Atropine overcomes this rigidity, but the yielding of the sphincter may be slow, although no posterior synechiæ are present.

The exudation may be confined to the stroma of the iris, or may pass to its anterior or posterior surface or to the pupillary area or anterior chamber; it may be serous, plastic, or purulent. The iris itself becomes much thickened antero-posteriorly, and its delicate striation disappears, owing to the blurring produced by the exudate which fills in the interstices of the stroma. The redness of the dilated vessels mixes with the normal colour of the iris and alters the natural tint, *viz.*, a blue iris becoming green, etc. The exudation may be so profuse on the anterior surface that it is sometimes seen as a distinct membrane of a greyish colour more or less like a net stretched over the whole or part of the iris. When the exudation overflows into the anterior chamber, the aqueous becomes turbid and the pupil looks milky instead of jet black. If the cells of the exudation are numerous and mixed with fragments of lymph, these may remain suspended in the aqueous and gradually by their weight settle down to the bottom of the chamber, forming hypopyon. In some cases the exudation may be very fibrinous and the whole aqueous may be converted into a coagulum, so that the anterior chamber is filled with a lenticular-shaped mass of greyish colour, looking like a dislocated lens; this is often seen in gonorrhœal iritis.

If the inflammation is very acute, blood may appear in the anterior chamber, forming hyphæma.

The exudation into the pupil can be seen as a greyish mass radiating from the pupillary margin into the pupillary area, and is often pigmented; if the whole area is occupied by exudation the condition of occlusio pupillæ is produced.

The most characteristic evidence of iritis, however, is obtained by the presence of exudation between the iris and lens, forming posterior synechiæ. These are sometimes visible by focal illumination or by transmitted light and can sometimes be detected by alternately shading the eye and exposing it to a bright light, when the pupil can be seen to be adherent at one or more points. The best way to demonstrate their existence is undoubtedly by the mydriatic test, as on dilating the pupil, the withdrawal of the iris to the periphery of the anterior chamber leaves the parts attached to the anterior surface of the lens exposed, and the long tags of pigmented exudation are then clearly visible on either focal illumination, or, better still, by transmitted light, as the dark triangles show up clearly against the bright red reflex.

Adhesions of the posterior surface of the iris to the anterior surface of the lens are due to the exudation which pervades the pigment layers and overflows on to the anterior surface of the lens, upon which the iris rests ; the immobility of the iris assisting the adhesions to form there. The posterior layer of pigment cells is easily detached, and is often found on the anterior surface of the lens after the pupil has been dilated. The synechiæ consist, then, of a fibrinous exudate with cells and pigment.

If the pupil is so bound down to the anterior surface of the lens that all efforts to dilate the pupil are futile, the condition known as "exclusio pupillæ" is produced, which is a serious matter, since the aqueous is prevented from reaching the anterior chamber and the fluid pent up behind the pupil causes the iris to be bowed forward, and produces the so-called *iris bombé*, which leads to glaucoma ; hence the importance of obtaining a dilated pupil as rapidly as possible, when treating iritis.

The duration of an attack of acute iritis varies greatly, but it will be best if we consider more or less typical cases. In the slighter form, the onset is gradual and the disease lasts about a month. The pain, of a dull aching kind, yields readily to treatment, and the pupil gradually dilates to a maximum under the influence of atropine, the mental condition and general well-being of the patient improves daily, so that the eye has returned to the normal and no evidence of the trouble is discoverable after four to five weeks. On the other hand, in cases associated with cyclitis, the onset is rapid, the pain is severe and is of a dull aching kind, as well as of a shooting lancinating variety. The redness and œdema of the conjunctiva are considerable, vision is reduced to mere perception of light, and the intense depression and irritability, so common amongst male patients with acute iritis, becomes well-marked. These cases may remain in the acute stage two to three weeks, and it may be two to three months before the redness leaves the eye. The cases of so-called "quiet iritis" give no sign of inflammation whatever, except the posterior synechiæ discovered when the patient seeks advice on account of failing vision. These are most difficult cases to treat, because the mischief is done before any warning has been given to the patient, and an excluded or occluded pupil may be present when first seen by the surgeon, thus necessitating an iridectomy in order to place the eye out of danger from glaucoma.

Ætiology.

Iritis may be primary, *i.e.*, due to local or constitutional causes, or secondary to inflammation in its immediate neighbourhood. Sympathetic iritis stands by itself, being different in its inception and results from other forms of iritis. Primary iritis may result from any septic process affecting the body, and this accounts for the long list of diseases with which it has been associated. Some micro-organisms, however, seem to develop in certain tissues of the body more easily than in others : compare the gonococcus in connection with the conjunctiva and urethral mucus membrane, with its effects on the mucosa of the lacrymal and nasal cavities. All the commoner varieties of pyogenic organisms or their toxins have been found in association with inflammation of the uveal tract, so we may assume that a septic focus present within the body is capable of being a cause of iritis.

Whether the same holds true of cellular toxins, the present state of our knowledge does not permit us to say. It is consequently of the greatest interest and importance that the surgeon should, if possible, find out the *causa causans* of any case of iritis he is called upon to treat.

Many ætiological factors are undoubted—syphilis, gonorrhœa, tubercle, etc.; others are less certain—rheumatism, pyorrhœa alveolaris, dyspepsia, and the uric acid diathesis; we can best consider these varieties separately.

With regard to syphilis, the iris is attacked both in congenital and acquired syphilis. In congenital syphilis it is rare as a simple manifestation, although of course in association with interstitial keratitis it is very common, since iritis occurs in all but the very slightest cases. Hutchinson described an iritis with much exudation as occurring in syphilitic infants when they are about five months old, but the commoner form attacks patients at 18 to 20 years of age in the form of a chronic irido-cyclitis with slight inflammatory changes. In the acquired form it occurs as a secondary manifestation, often at the same time as the rash, and before the chancre has disappeared, also as a tertiary symptom many years later, and it is then of a gummatous nature; a large number of the cases of "quiet iritis" are to be placed in the last group. In syphilitic cases a marked anæmia of the patient shows itself, and definite alterations of the solid constituents of the blood are found, such as an increaseof the mononuclear cells and a diminution in the hæmoglobin. In all cases where the ætiology of syphilis is doubtful, a Wassermann reaction should be made. The gonococcus has an affinity for the uveal tract. Gonorrhœal metastases of the vascular coat of the eye were recognised many years ago, and are often associated with articular troubles and other evidence of systemic gonorrhœa; there are special clinical forms attributed to it, although it is probable that gonorrhœal iritis does not always manifest itself in a particular form. One variety exhibits profuse exudation, so that the anterior chamber seems to be filled with a gelatinous exudate, resembling a dislocated and slightly cataractous lens. Another form, not so common, exhibits long thin adhesions, with much pain and ciliary congestion, together with a tendency to become chronic. C. Higgens described in the *Lancet*, some years ago, a clinical picture of gonorrhœal iritis, "The patient, nearly always a man, giving a history of repeated attacks of gonorrhœa—painful, often severely so; there is swelling of the iris, generally much photophobia, a strong tendency for adhesions to form, although there is no great amount of exudation, with much ciliary and conjunctival congestion. There is also a decided inclination to contraction of the pupil, which strongly resists the action of mydriatics, of which there is often a marked intolerance; a tendency to increased tension, a general intractibility rendering treatment most difficult, and its results most disappointing."

Tubercle attacks the iris, and, as in other tuberculous affections, its course is marked by great chronicity, slight pain, and intractability to treatment. Tubercle affecting the iris may or may not give any distinctive evidence of its nature, and Koch's tuberculin test or von Pirquet's cutaneous reaction should be employed if the diagnosis is doubtful.

A clinical picture of tubercle involving the iris is suggested by the presence of nodules on the anterior surface of the iris, more especially towards its periphery, the raised masses of which, if sufficiently high, reach up to and press against the deep surface of the cornea, where its irritant action causes an interstitial opacity; there may be also "mutton fat" deposits on the back of the cornea, together with larger fatty-looking masses in the anterior chamber. Interstitial opacities in the cornea may occur independently of the presence of nodules.

Traumatism does not produce any inflammatory reaction, provided no septic infection takes place.

Simple iridectomy wounds of the iris show no evidence of inflammation, either immediate or remote, so that any so-called traumatic iritic changes are due to microbic infection, and the clinical result will depend on the organism, its virulence, and the resistance of the host.

Iritis is undoubtedly associated at times with a sub-acute articular malady; this has been thought to be rheumatic in origin, whereas the probability is that they are cases of acute or sub-acute rheumatoid arthritis; that being, according to modern views, associated with chronic septic infection, often oral in origin. I have never seen iritis in a case of acute rheumatism, and it has been recorded as having occurred only a few times; it is so infrequently met with, that its association with acute rheumatism seems to be rather a coincidence than a cause and effect. It does not seem that the organism responsible for rheumatic fever shows any strong predilection for the uveal tissue, certainly not during its acute stage, although it might naturally be expected to do so; rheumatic fever being in the nature of a toxæmia might be looked upon as a probable cause of iritis. Macrae noticed it once in 270 cases, and an instance was reported in the *British Medical Journal* in 1903; this last is open to the suggestion that the case was not rheumatic, but due to sepsis absorbed from the tonsils. However, Drs. Poynton and Payne have succeeded in producing iritis in rabbits after injecting them with a diplococcus obtained from fatal cases of rheumatic fever, that is the micro-coccus rheumaticus.

Iritis is associated with rheumatoid arthritic cases in which definite bone changes have taken place, the result of a septic infection by staphylococci, streptococci, etc., and I have noticed in these a tendency to post-operative inflammation of the uveal tract.

In connection with iritis due to a general systemic infection resulting from absorption from mucous surfaces, gonorrhœal iritis is a well-proved condition, and although it is impossible to demonstrate unequivocally that late infections (the original urethritis or vaginitis having been contracted twenty or thirty years previously) are really gonorrhœal and not due to some other of the various causes of iritis; still a sufficiently large number of cases has occurred in which the iritis has developed in close association with an arthritis and an acute urethritis or vaginitis, proving conclusively that the eye condition is dependent on a toxæmia due to absorption from the genital mucous membrane. The number of cases of idiopathic iritis is certainly diminishing, and we must enlarge our view of the ætiology of iritis, and include as causes septic absorption from the teeth, antrum of Highmore, tonsils, and nasal mucosa, as well as septic conditions either in the pelvic organs or intestines.

The mouth and teeth are daily becoming more and more recognised as causes of chronic septic poisoning, and that being so, the iris is likely to be attacked, not only by a chronic iritis but also by acute conditions. Gout has for very many years been credited as an ætiological factor in inflammations of the iris, but undoubtedly many gonorrhœal cases were euphemistically attributed to gout, especially those occurring in middle-aged men who had had a gonorrhœa many years before, and who had since exhibited symptoms of over-generous diet and good living. There is, however, much weighty evidence in favour of true gout being occasionally a causative factor in iritis. Doyne has described a guttate iritis, in which small warty-looking translucent excresences occur on the pupillary margin; it is rare, occurs in elderly people, more often in women than in men, and is, he thinks, the truest form of gouty iritis he knows.

Diabetes, on the other hand, is probably more frequently associated with iritis than the published cases would suggest. Only fifteen cases of diabetic iritis seem to have been published in France between the years of 1863-1908, a period of forty-five years; probably far too small a computation. Iritis, or rather irido-cyclitis, is frequently found in leprosy, and in all the cases I have seen, some seven or eight in number, the iris has been fixed to the lens by firm adhesions, and in some instances an excluded pupil has resulted. The inflammatory symptoms have not been acute and the iris has shown signs of atrophy. It would be impossible to mention all the various conditions with which iritis has been associated, and it would not, I think, effect any good purpose to do so; I can only emphasize the fact, which seems to me to be well supported by clinical evidence, that every case of iritis is of septic or toxic origin, and may be exogenous, that is, due to an infection introduced into the eye through a wound, or endogenous, that is, conveyed to the eye by the blood stream. Hence it is not surprising that iritis has been found associated with typhoid fever, pneumonia, mumps, influenza, vaccination, albuminuria, and cerebro-spinal meningitis, etc. Sydney Stephenson, in a short article published in THE OPHTHALMOSCOPE, Vol. V, stated the case very clearly when he said "the ciliary processes, whose vital cells are possibly modified molecularly by a virus, say that of syphilis, circulating in the blood stream, makes an attempt to excrete the extraneous substance. The virus, be it micro-organism, or bacterial, or cellular toxin, thereby gains access to the posterior and anterior chamber of the eye, and in doing so excites inflammatory reaction in the tissues such as the iris, that it comes in contact with. The reaction visible clinically, is on this hypothesis to be regarded as Nature's attempt to excrete the poison, whatever its exact nature."

Secondary Iritis.

Iritis may result from septic poisoning obtained from a focus in its immediate proximity, the conjunctiva, cornea, ciliary body, choroid, retina, or sclerotic. It is a very frequent complication of corneal ulcer, especially those suppurative forms of keratitis associated with serpiginous ulcers; the hypopyon then formed being due to inflammatory material derived from the iris and ciliary body. Septic and perforating wounds also involve the iris and may lead on to a general panophthalmitis. A case of iritis associated with herpes facialis, in which the iritis followed the development of the vesicular lesion, ought to be included under this heading. Iritis, however, does not frequently result from conjunctivitis, and even after gonorrhœal ophthalmia, when the corneal opacity has cleared sufficiently for the iris to be seen, it is generally found that the pupil reacts to light and accommodation, and that it is not adherent, unless perforation of the cornea has taken place. Of course, the iris membrane may have been involved during the height of the attack and recovered; most ophthalmic surgeons would instil atropine as a routine during the inflammatory period, and the time that must elapse before any examination of the iris could be made is often long; but I have been surprised at the small amount of damage done after severe cases of gonorrhœal ophthalmia in adults and in ophthalmia neonatorum, where no perforation has taken place, although the corneal tissue may have been seriously involved.

This observation does not apply to all cases, for, as before stated, even small serpiginous ulcers of the cornea may give rise to extensive hypopyon, which is an indication of severe pathological change taking place in the iris.

Treatment.

There are three important points to be remembered in treating iritis successfully; one is to keep the pupil as widely dilated as possibly; a second, to search out diligently the *causa causans*; and a third, to relieve pain. Do not be satisfied with a vague history of gout or rheumatism, and if no general constitutional cause is probable, then search for a particular focus of septic absorption. If no certain cause can be ascertained, the case must be treated on general principles.

The patient in a severe case should be kept in bed, or at least in a warm atmosphere; all stimulants avoided, as well as meat. The bowels are to be kept open by calomel and salines, so that an action is assured twice a day; this is the best, if not the only satisfactory intestinal antiseptic. The patient should not be starved, but kept on light nourishing food that is easily digested. If the pain is severe, hot fomentations and diaphoresis should be used, also dionine in increasing strengths 1, 2 per cent. to 5 per cent. solution instilled into the conjunctival sac.

A useful prescription is the following:—

Atropine sulphate grs. 4. Dionine grs. 12.
Cocaine hydroch. grs. 4. Aq. distil. ad. ℥j.

One drop into the eye every three hours until the pupil dilates. Aspirin, 10-20 grs. two or three times a day, is very valuable; but when the pain and inflammation are intense nothing affords so much relief as blood letting, and two to four leeches applied to the temple on the affected side sometimes act like a charm. It is better to remove too much blood than too little, and the hæmorrhage may be increased by hot fomentations until the pain is relieved. The process can be repeated if the pain returns.

The eye should be kept loosely bandaged, and the light in the room diminished, but not excluded. The unaffected eye should not be used for any reading, writing, or close work. When there is much exudation, mercury and iodides are always useful, no matter what the ætiology, and should be employed when a probable cause cannot be ascertained. Mercury seems to have a beneficial influence on many acute inflammatory conditions of the iris. Atropine is far and away the best and most powerful mydriatic, but, unfortunately, we find that it sometimes produces an acute dermatitis in patients who are peculiarly susceptible to the drug. The substitutes for atropine are scopolamine hydrobromate, homatropine hydrobromate, duboisine sulphate. These may be used in solutions of $\frac{1}{2}$ to 1 per cent. The beneficial action of a mydriatic is due to the fact that it diminishes the hyperæmia, breaks down adhesions, removes the pupillary margin from close contact with the anterior surface of the lens, and keeps the sphincter pupillæ at rest. In chronic cases of iritis, where the inflammatory symptoms have passed away, Turkish baths and mercurial inunctions are useful in helping absorption of inflammatory *débris* left by the acute attack. The usual method of carrying this out is for a hot bath to be taken three times a week at bedtime, and after the bath, a drachm of the ung. hydrarg. oleatis should be rubbed into the skin until the ointment disappears. Free diaphoresis should be promoted by hot drinks and pilocarpine injections, 1/8-1/12 gr. Sub-conjunctival injections of salt solution or iodipin also help in clearing up posterior synechiæ and vitreous opacities. Vaccine treatment has been successfully carried out in tubercle and gonorrhœa, and also in those cases where the iritis is due to a chronic poisoning by a well ascertained micro-organism; it is to be strongly recommended after the acute stage has passed off. In tuberculous cases also, sterile air forced under the conjunctiva, close to the corneo-scleral margin and also into the anterior chamber, has been advocated.

Guaiacol ointment, 3 per cent., rubbed into the skin of the lids and around the orbits, also sub-conjunctival injections of cacodylate of guaiacol, 2 per cent., should be employed, some Continental surgeons looking upon guaiacol as a specific for tuberculous affections of the eye, much in the same way as the salicylates are for rheumatic affections.

Traumatic infective iritis is always a grave condition, the infection may be due to any micro-organism present in the conjunctival sac, or on the instrument with which the wound was made. If the wound itself shows signs of infection, the infected margins should be cauterised with a fine thermo-cautery, or the infected areas cut away and then the cautery applied. Every care should be taken to allow free drainage of any septic material coming from the deep part of the wound; so long as the aqueous is secreted, there will be a flow from the anterior chamber through any opening remaining in the cornea. On the other hand, where we have a well-established septic condition outside the eye, the conjunctiva should be used to cover the wound and prevent any fresh infection taking place; this will not prevent the aqueous draining away, but will assist in the more rapid closure of the wound and its being quickly covered with a protecting layer of lymph. The best way to deal with any septic material planted within the eye is by freely washing out the anterior chamber with a very weak solution of sublimate (1 : 12,000) or normal saline solution.

Afterwards, a sub-conjunctival injection of cyanide of mercury and acoin should be made and dionine dusted over the wound. The sub-conjunctival injections should be repeated as soon as the inflammatory reaction has passed and the conjunctival sac must be continually irrigated by antiseptic lotions.

Darier speaks most enthusiastically of injections of anti-diphtheritic serum (8 : 10,000 units. Behring) in all cases of infective traumatism of the eye. Theoretically, a vaccine should be prepared from the attacking organism, but this is impossible practically, as by the time the organisms, whether one or many, have been isolated and the vaccine prepared, the eye will have been lost. Anti-diphtheritic serum is always at hand and should be injected at once.

Where hypopyon has formed, even if the anterior chamber is half filled with the exudation, or so-called "pus," it is quite unnecessary to remove it; it will be absorbed as soon as the inflammation of the iris has subsided. Frequently these exudations are sterile. Chronic and relapsing iritis often leads on to "seclusio pupillæ" and then an iridectomy should be performed often a difficult matter owing to the iris being ballooned forwards and touching the deep surface of the cornea. In a case of relapsing iritis, where the pupil is not entirely bound down by the synechiæ, an iridectomy will diminish the number and severity of the attacks, and should always be employed as a therapeutic agent.

A CASE OF CHRONIC MEMBRANOUS CONJUNCTIVITIS TREATED WITH VACCINES.

BY

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THERE is a form of membranous conjunctivitis whose distinguishing features are its prolonged chronicity and its tendency to leave granulations upon the palpebral conjunctiva.

Other points of distinction are its slight infectivity, superficial nature of the membrane, free bleeding from the conjunctival surface after removal of the membrane, and frequent involvement of the cornea and often loss of the eye.

Nettleship (*St. Thomas's Hosp. Reports*, Vol. X, p. 25, 1879) pointed out the undesirability of using the terms "croupous" and "diphtheritic" in an ætiological sense, as whatever the ætiology, the anatomical conditions vary. The only helpful method is to designate it by the particular organism found on bacteriological examination of the membrane.

The Klebs-Loeffler bacillus is the most frequently found, but it rarely produces a membrane that lasts more than a few days. In these chronic cases the organism usually responsible is a streptococcus, and it is worthy of note that in the majority of the recorded cases there has been a history of measles, scarlet fever, or whooping cough.

The case recorded below is of interest from the presence of an influenza-like bacillus, which reappeared in a relapse a year later; this was mixed with what at first appeared to be a pneumococcus, but on further investigation turned out to be a streptococcus.

After ineffectual treatment locally, a vaccine was made, but being given in apparently too large doses, the conditions became worse. It was dropped for a time and resumed again with very small doses. This proved effectual, and on a relapse taking place some months later, it was employed again and led to the disappearance of the membrane in a few days.

Knapp reports a case (*Archiv. of Ophth.*, Vol. XXXIII, 4, p. 386,) of a child six weeks old with a thin pseudo-membranous conjunctivitis with perforation of the cornea. A bacillus was found and identified with the bacillus of influenza.

Perhaps the reported cases that most resemble the one here reported, both in length of time and the after-growth and persistence of granulations are: a case reported by Stanford Morton (*Trans. Ophth. Soc. U.K.*, Vol. XIII, 1893) in which membranes persisted for two years, caused ulceration of the cornea and panophthalmitis, and pedunculated masses of granulation tissue sprouted from the conjunctival surface of the upper lid and had not disappeared at the end of seven years, at the time of the report, despite frequent removals; a case reported by Businelli (*Gaz. Med. p. le prov. Venete*, No. 16, 1872) of a girl, aged 12 years, with membrane, free bleeding, fungous granulations, and no effect from treatment, either local or constitutional, lasting two years up to the date of the report; Derby (*New York Eye and Ear Infirm. Reports*, Part III, 1894) reports a case of a child, seven years old, with membrane followed by granulation tissue in the fornix. The case lasted nine weeks, and the same child returned five years later with the other eye affected, abscess of the lacrymal sac, and loss of the cornea; duration two months to time of the report. Derby inoculated rabbits with pieces of the membrane and also rubbed the conjunctival sac with membrane, with no results. He obtained streptococci, staphylococci, and a short bacillus, which did not present the characters of the Loeffler bacillus, from the cultures. He inoculated the eye of a rabbit and produced panophthalmitis, but had no results from rubbing the culture into the conjunctiva.

In addition to the three just mentioned, Knapp (*Arch. of Ophth*, Vol. XI, p. 1, 1882) reports two cases: male, aged nine years, both corneæ involved, right eye lost, granulations, duration five months; male, aged five years, cauliflower excrescences on the palpebral conjunctiva, right corneæ lost, free bleeding, duration about five months; treatment with astringents and caustics of no avail, but the application of cold was found beneficial.

The case here reported came under my notice on the 10th of January, 1910.

G. S.——, a male child, three months old, was brought by his mother to St. Bartholomew's Hospital on January 6th, with discharge from both eyes. The mother said the eyes had been bad two days. The lids were painted with a solution of silver nitrate.

On the 10th I saw the child and found a tough greyish-white membrane covering the conjunctival surface of both upper and lower lids in the two eyes, the left being much the worse of the two. The cornea of the right was clear, but the left was hazy. There was some bleeding on removing the membrane.

The eye was washed out with perchloride of mercury lotion, 1 in 6,000, and the lids were painted with a solution of silver nitrate, 10 grs. to the fluid ounce.

On the 13th the left cornea had a ground glass appearance, the right being hazy. Atropine was ordered. By the 20th the left cornea was sloughing, but the right eye looked better.

A report was received from the Pathological Department that the examination of the membrane had shown pneumococci. The membrane continued to form and more cultures were made, and another report was received on the 31st that both pneumococci and the influenza bacillus had grown.

On February 3rd a vaccine was made from mixed organisms, and a dose of 2,000,000 given.

On the 7th, there was less discharge and thinner membrane, and on the 10th a similar dose of vaccine was injected, the condition at that time being, no membrane in the right, and but slight in the left.

On the 14th, the condition of the eyes was the same, but the child was ill, looked pale, and had vomited. The mother was feeding the child on the breast. On the 17th, the membrane had formed again, and another dose of vaccine was given. The atropine was left off, owing to atropine irritation.

Between the 17th and the 28th, the eyes became steadily worse, the left cornea had perforated, and there was a copious discharge from both. The vaccine was again repeated.

During the vaccine treatment the silver applications had been left off. As the child appeared to be going back under vaccine treatment, not only in the eye conditions, but in general health, it was discontinued. The eyes were washed out as before, the membrane removed and silver applied. The child began to recover in bodily health, and the eye condition became less acute, but the membrane still persisted. The left eye was gradually shrinking, the right free from ulceration, although the cornea was infiltrated.

This continued until May 2nd, when protargol was substituted, and instead of removing the membrane, it was left untouched.

By June 6th, the conditions had not altered, slight variations being noticed week by week, although there was less photophobia.

The membrane was again sent to the Pathological Department, where it was found to consist of fibrin, with entangled leucocytes and cellular *débris*. The growth obtained was of pure pneumococcus.

A vaccine was again made, and a dose of 5,000,000 given on June 13th. Three days later the child was brought with increased discharge, thick membrane, and the mother stated that he had been very sick and ill since the injection. On the 20th the lids were worse, the membranes were less tough but thicker and flocculent. The child was crying a great deal. Three days later the right upper lid was very swollen, with increase of the discharge. Fresh cultures were taken and a rat was inoculated. On the 27th the right eyelids were very much more swollen, and felt stiff and hard. There was a very firm, adherent grey membrane covering the whole conjunctival surface in both eyes, and forming leathery prominent masses.

The child was now admitted into the Hospital on June 29th. The pathological report now was that the organism was streptococcus and that the same organism had been recovered from the body of the rat, which had died. A vaccine was made from this culture and a very small dose was given, 400,000, this was increased to 800,000 and in all four doses were given while in the Hospital, a period of between five and six weeks. The child reacted in no way to these small injections as it had done before, but gradually improved, and on leaving the hospital on August 6th there was no membrane on either eye. Instead, there were protuberant granulations springing from the conjunctival surface of each lid, those of the left being the larger, probably on account of the shrunken globe giving more room for expansion.

With treatment by zinc sulphate lotion the granulations in the right eye gradually became smaller, but those of the upper lid on the left side still persisted.

The lacrymal passages soon after became affected, and there was a blennorrhœa of both lacrymal sacs. There was no further formation of membrane.

This condition lasted until May 1st when there was a relapse with a fresh formation of membrane on the upper lids of both eyes, involving only the palpebral conjunctiva. The membrane was smooth, dirty-white, thick, and the tissues bled when it was removed. There was much œdema of the lids and skin in the neighbourhood. The cornea was unaffected. The pathological report was:—smear preparation showed a diplococcus, no capsules visible; growth on agar, clear colonies of a bacillus of influenza type, mixed with some colonies of streptococci. The patient at this time was attending daily, and the membrane was removed and the conjunctival surface of the lids painted with protargol up to the 12th of May.

On the 11th an autogenous vaccine was given, dose 400,000 and no other treatment with exception of perchloride of mercury lotion used three times a day by the mother, strength 1 in 5,000.

On the 15th the membrane had disappeared from the right eye, and the membrane of the left side was thinner. On the 18th 500,000 of the vaccine was given. No membrane on either lids and no effect on the health of the child. On May 25th vaccine again in a dose of 700,000. No return of membrane, but granulations persisting on the left side if anything larger. On June 8th vaccine 1,000,000. June 15th vaccine 2,000,000. No further development of membrane.

On July 6th condition now as before the relapse. Small granulation removed from right upper lid, but recurred in a few days. Sprouting granulations from the left conjunctiva, with much discharge, and blennorrhœa of the right lacrymal sac.

For the next eight months up to the time of writing these conditions continued with little change, although when last seen, the granulations had shrunk a little and the discharge was much less. The child had grown well and improved in health. No further formation of membrane had been noted. The duration up to the present time is nearly twenty-six months. How much benefit, if any, in helping to remove and prevent the membrane from recurring was due to vaccine in this case, it is difficult to say, but that the same organisms appeared in the year-late relapse as were present originally, and that the membrane gave way on both occasions when the vaccine was given in suitable doses seems in favour of the therapeutic influence of the vaccine.

Note on the Bacteriology by J. E. H. Roberts, F.R.C.S.

On January 13th, 1910, films of the discharge showed scanty Gram-positive diplococci of lanceolate form with ill-formed capsules. Cultures on blood-agar plates grew numerous discrete colonies, which in forty-eight hours became "ringed" in the way which pneumococcus colonies do. The colonies were composed of typical lanceolate diplococci. Capsules were present but were ill-developed.

On January 31st a new culture was made on blood-agar plates. The same diplococcus was present with numerous transparent dewdrop colonies of a minute Gram-negative bacillus resembling the influenza bacillus. On subcultivation this grew on blood-agar but not on plain agar. The first vaccine was made from this mixed culture.

A culture on June 6th again gave a growth of diplococci in "ringed" colonies. No bacilli were present on this occasion. The five million dose of vaccine now given was from a stock vaccine made from a pneumococcus isolated from a case of pneumonia. The increased discharge which followed might be attributed to an overdose but as a culture made by Dr. Gordon in my absence on June 29th gave a growth of a streptococcus which did not become "ringed," and was not lanceolate in form, it is more probable that a new infection had taken place.

Cultures made in the relapse of May, 1911, showed the same organisms as at first, *viz.*, a lanceolate diplococcus and an influenza-like bacillus.

CLINICAL MEMORANDA.

VOLUNTARY NYSTAGMUS.

BY

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LATE HOUSE-SURGEON OXFORD EYE HOSPITAL.

The case reported by Major Elliot in the February number of The Ophthalmoscope recalls a case recently seen by me in Berlin. The individual was one of the freak type, who profit from their idiosyncrasies by exhibiting themselves at the round of clinics, and so no extensive notes are at my disposal, as I merely witnessed his exhibition. He was a man of about 35; by staring fixedly into distance and evidently exercising some forced mental concentration, he induced a left-sided horizontal nystagmus, of no great excursion, possibly 0·25—0·5 mm., yet of considerable rapidity, about thirty oscillations to the minute. The nystagmus was confined to the left eye, the right remaining steadily fixed upon some distant object. Under normal circumstances no such nystagmic movement of the globe, or globes, could be discerned. As far as is known, no ocular defects were present, certainly none were mentioned, and nothing in the way of nebula or other external stigmata were to be seen, but the fundus was not examined.

In addition to this trick, the patient had a degree of control over the sphincters iridis, inhibiting its action and producing a dilatation of the pupils unassociated with any convergence or divergence of the globes.

Another of his achievements was an inhibitory effect upon the right external rectus, by means of which he could prevent the right globe from crossing beyond the right mid-vertical plane during the simultaneous over stimulation of the left internal rectus, which carried the cornea into contact with the caruncle.

Such other refinements as voluntary dislocations of elbow, hip, shoulder joints and abdominal organs, specific ulcerations, thermo-cutaneous anomalies, have no command of our attention.

Cases of voluntary nystagmus are but sparsely scattered through the literature, some seventeen being all that I can get together—this, however, does not purpose being a complete series of the cases reported. The above case differs from the majority in that the oscillatory movement was unilateral, and that it was not so grossly rapid as most cases. It resembles all the others in being of the horizontal type. Other recorded cases are :—

By Major Elliot.[1]—Male, *æt.* 30, vision good, no ocular defects or stigmata. As long as he can remember, he has possessed the power of producing a voluntary nystagmus. Staring straight before him, within a second or two begins a horizontal, binocular, oscillitory movement, of large amplitude, and too frequent to count. On several occasions, of recent years, the phenomenon has occurred spontaneously, and he has been able to control it ; such happens as a rule when he is tired. On the other hand, it is easier to induce the nystagmus when he is fresh.

By A. W. Stirling.[2]—By a curious coincidence, this case appears on the page facing the former case, in recording which Major Elliot refers to the comparative infrequency of the condition. It dealt with a female, *æt.* 24, suffering with anisometropia, hyperopia, a partially amblyopic left eye, 5° heterophoria and 4° hypophoria. Ever since childhood she could induce a nystagmus, of the horizontal species, with very rapid oscillations—about the rapidity with which the hand could be shaken—and an amplitude of 1 mm.

By Henry W. Williams.[3]—A male, 45 years of age, had a traumatic defect of right eye, dating back only some five years. He had an extraordinary power over the muscles of the globe, by which he gave to the eye almost inconceivably rapid oscillating movements, in every direction, and at pleasure. The motions resembled nystagmus, but were much quicker and could be made with equal readiness in the horizontal, vertical, or rotatory manner. In addition, he could produce a "slight quivering of the globe." He discovered at the age of eight years that he could give to a candle flame an apparently dancing motion, and by practice furthered the effect produced. This is the sole case I can find in which other than the horizontal nystagmus was in evidence.

George Lawson[4] records the case of a male patient who, after fixing both eyes, could set them in rapid motion laterally—so rapid that the outline of the cornea was completely lost. Another case he saw was that of a late house-surgeon of the Royal London Ophthalmic Hospital, who first had to converge and produce a strabismus before the rapid nystagmic oscillations were to hand. Both had complete control of the phenomenon.

Raehlmann[5] records a case taken from the work of Fano (*Traité des Maladies des Yeux*, T. II, p. 660). The patient was a medical student, *æt.* 25, who observed some years previously, while in the sporting field, that he had the power of inducing a nystagmus—"*le globe s'agite en se portant de droite à gauche, et de gauche à droite, et aussi de suite. Le mouvement commence de même qu'il cesse, brusquement et sans effort, aussitôt que je le veux.*" The exercise left no malaise, was under supreme control, and the eyes were otherwise normal.

Raehlmann then records two cases of his own—cases of horizontal nystagmus characterised by extreme rapidity of oscillation. In one case there was a preceding involuntary nystagmus which had been relieved.

Lafon and Bonnet[6] had a male *æt.* 29, of excellent constitution, and displaying no manifestations of central nervous degeneration, who had a slight ametropia, but otherwise normal eye. After fixation of a distant object, a voluntary horizontal nystagmus could be called up.

Coppez[7] demonstrated before the November, 1907, meeting of the Belgian Ophthalmological Society a youth of ten, a victim of ophthalmia neonatorum with bilateral central nebulæ and anterior capsular cataract. He read and wrote without glasses and without any nystagmic manifestations. On demand he could induce a nystagmus, the left eye previously turning out and upper lid being somewhat elevated. The nystagmus was of the very rapid type, horizontal, and 2-3 mm. in amplitude, and would continue till the patient would wish it to cease. It was associated with an anisocoria which became manifest after some ten oscillations.

L. Hirsch[8] observed a miner who, after inclining the head and trunk forward and rapidly correcting himself to the erect posture, could effect a lateral nystagmus. In this case there was the reservation that the demonstration could be enacted only in a dark room.

Pyle[9] reports a case, *æt.* 22; the patient fixed with right eye while the left first converged, and then went into a nystagmic oscillation for some thirty seconds. The patient could inaugurate or check the process at will.

Maversberg[10] had two cases. I.—Female, *æt* 16. No involuntary nystagmus was to be observed in any excursion of the eye, nor had the patient ever been the subject of the defect. At will, after directing the eyes in an extreme lateral direction, a lateral nystagmus could be induced; it was of a large excursion, and of some forty oscillations per minute. The eyes were normal and emmetropic. Some headache followed the indulgence. II.—Female, *æt.* 23. Vision had always been good, and patient came of healthy stock, not involved in nervous diatheses. In early youth she observed her ability to jerk the eye, and apparently took no small delight in humouring herself by the induction of the nystagmus while gazing at bright objects—a polished door knob being her favoured object—whereby a blazing linear firework resulted. The exercises were the pride of her peasant surroundings! In the early days the movements were slow, but by persevering she was enabled to bring them to a high degree of efficiency. Ophthalmoscopic examination was negative.

Benson[11] has reported one case, to the notes of which I have no access.

Dodd[12] likewise had a case, demonstrated before the Ophthalmological Society of United Kingdom (details unknown).

In all, then, some seventeen cases.

REFERENCES.

(1) **Elliot, Major.**—THE OPHTHALMOSCOPE, Vol. X, No. 2, February, 1912.
(2) **Stirling, A. W.**—THE OPHTHALMOSCOPE, Vol X, No. 2, February, 1912.
(3) **Williams, Henry W.**—*Ophthalmic Hospital Reports*, Vol. V, 1866, p. 223.
(4) **Lawson, George.**—*Ophthalmic Hospital Reports*, Vol X, 1882, p. 203.
(5) **Raehlmann.**—v. Graefe's *Archiv für Ophthalmologie*, Bd. XXIV, 1878, S. 237.
(6) **Lafon** and **Bonnet.**—*Recueil d'Ophtalmologie*, 1910, p. 320.
(7) **Coppez.**—*Monatsblätter f. Augenheilkunde*, 1908, Heft i, S. 557.
(8) **Hirsch, L.**—*Monatsblätter f. Augenheilkunde*, 1908, Heft i, S. 315.
(9) **Pyle.**—*Ophthalmic Record*, 1908, p. 356.
(10) **Maversberg**—*Zeitschrift für Augenheilkunde*, Bd. XXII, 1909, S. 117.
(11) **Benson.**—*Ophthalmic Hospital Reports*, 1883.
(12) **Dodd.**—*Trans. Ophth. Soc.*, 18th October, 1900, Vol. XXI, p. 244.

GONORRHŒAL IRITIS COMPLICATED BY INTERSTITIAL OPTIC NEURITIS.

BY

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ON June 17th, 1911, a gentleman (A. B——, *æt.* 53 years) consulted me, suffering from very acute iritis and most intense pain.

History.—One week ago, after a motor journey, the right eye became painful and red, but in two days it improved considerably. After the return motor journey, the eye became much worse. It was very red, and he suffered intense pain in the eye and right side of the head.

Previous History.—Syphilis denied. Gonorrhœa was contracted about thirty years ago. It was a severe attack, not carefully treated and never quite cured, as he has, on and off, always had a gleet. He denied any subsequent gonorrhœal infection. He has always suffered from rheumatism (probably gonorrhœal); ten years ago he was crippled with rheumatism, chiefly articular, and in the feet.

He has had three previous attacks of acute iritis—always in the right eye—without any resulting loss of vision. The last attack was ten years ago; the date of the two previous attacks could not be fixed; he was then in the Colonies. Mother and one brother have also suffered from acute iritis.

Present Condition.—Intense iritis in right eye; no deposits on the back of the cornea or on the lens. Tension slightly below that of the left eye. Vision.—Right eye = fingers at 1 metre. Fundus not seen on account of turbid vitreous.

Treatment consisted of atropine and dionine, two hourly hot fomentations, mercurial inunctions, leeches, free purgation, and rest.

On *June 21st* he was in less pain, and there was improvement in his vision.

June 29th.—His vision was 6/36 c. + 1D. sph. = 6/24.

Urine examined, sp. gr. 1006, no albumen or sugar, numerous long urethral threads.

Eye still very red, but not painful. Ordered potassium iodide, grs. x., *t.d.s.*, with nux vomica and ammonia.

July 21st.—Bacteriological report of the urinary deposit by Mr. M. S. Mayou:—"The centrifugalized urinary deposits contain numerous undoubted gonococci, together with a few staphylococci. Pus cells are present in considerable numbers, and a few red blood corpuscles."

August 2nd.—Gonococcal vaccine (B. W. & Co.) dose 20 million injected. Marked improvement in the condition of the eye in twenty-four hours.

Until the end of August he was under Mr. Mayou's care during my absence. He administered two injections at ten days' interval. August 22nd, patient complained of sudden loss of vision, he only had hand movement—no pain. In an examination of the fundus, Mr. Mayou found well-marked optic neuritis and a patch of exudate below the macula. Veins engorged and covered with exudate, disc edge markedly blurred. Field for white full, but marked central scotoma for colours, 10° green and 15° red.

August 29th.—Red-green scotoma slightly smaller. 10 million dose of gonococcal vaccine given. Vision 6/36. Colour scotoma still present.

September 3rd, 1911.—Taking grs. x. potassium iodide for last ten days. Vision much improved. c. $\frac{+\ \cdot75\ \text{D.sph.}}{+\ 1\cdot25\ \text{D.cyl.}\ 90^\circ} = 6/9$. Neuritis improving. Still some exudate in the macular region.

September 21st, 1911.—Relapse, some redness and discomfort. Vision much worse: with correction=6/36 Atropine and potassium iodide continued.

October 31st, 1911.—Much better. Vision 6/6 (2 letters) with correction. An injection has been given fortnightly. Some tortuosity of vessels: macular exudate clearing up. Urethral threads still present.

December 1st, 1911.—Eye quiet. Colour vision normal. Vision 6/9 fully with correction.

Remarks.

Cases of gonorrhœal iritis occurring many years after the primary infection are of great interest. This case demonstrates better than most the fact that gonococci may exist in and around the urethra for thirty years and still retain their activity.

Although the gonococcus cannot be usually demonstrated in this class of case, it must, of course, be present in the prostate, vesiculæ, or urethral crypts, and I am of opinion that if in these obscure cases the urine passed after massage of the prostate, &c., through the rectum was always examined, gonococci would be demonstrated more frequently and the diagnosis placed on a more certain basis.

The complication of interstitial neuritis in this case is also of rarity and interest. I think it was due to the gonococcal poison. There appears to be no reference in ophthalmic literature to the gonococcus as a cause of interstitial optic neuritis, yet it is interesting to note the obscure ætiology of this type of neuritis in many cases, and also the latency and obscurity of the gonococcus in the urethral tract.

I consider the vaccine treatment very definitely assisted in obtaining a good result.

NOVELTIES.

A CONFUSION TEST FOR COLOUR-BLINDNESS.*

BY

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THE work described in this paper was done in conjunction with the late Lieut.-Col. W. R. L. Scott, formerly of the 62nd Foot, who was very nearly, but not quite, red-blind. He could not under ordinary circumstances distinguish the red coat of a soldier from the black coat of the civilian, although on closer inspection it seemed "not so good a black." His colour-sensations are given in my paper on "Artificial Temporary Colour-Blindness."†

He continued to take an active interest in the subject, and gave me a good deal of help from time to time in testing the colour-sensations of other people, in which he was very successful, his own colour-blindness enabling him to win their confidence. It had been intended that his name should appear as joint-author of this paper, but he died on April 9, 1911, aged 78.

In the summer of 1903 we arranged to collaborate in painting a series of test-cards, accurately adjusted to his colour-sensations, oil-colours being selected, as easier of manipulation than water-colours, and less likely to fade.

1. For the first, I painted the half of an Academy board, 9 inches by 7 inches, with two coats of vermilion, using very little medium and painting as solidly as possible. When this was dry, several different kinds of green

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*Read before the Royal Society on March 28th, 1912.

† *Phil. Trans.*, B, Vol. 191, p. 29.

were mixed, spread on strips of wood, and held near the red background, the most satisfactory being selected by Lieut.-Col. Scott, who indicated which of the colours on the palette might improve it. This I tried until he expressed himself completely satisfied with the match. My function was to make the colours as unlike as possible to normal eyes, and his to make them match perfectly to the red-blind. The other half of the board was then painted with the mixture, which was about the colour of a year-old ivy leaf, and it was allowed a fortnight in which to dry and also to see if any change of colour occurred on drying.

I then painted, in his absence, on the green part of the card the words DON'T GO, the letters N'T being in vermilion and the rest in blue. The blue he could see immediately—in fact there seems to have been to him as much difference between green and blue as there is to us between red and green. But he read the inscription as DO GO, being absolutely unable to distinguish the letters in vermilion. After a while, by holding the panel sideways, so as to get the light on the brush-marks, he managed to decipher them, but he could see no difference in colour. In order to prevent the brush-marks from being seen, I devised the plan which constitutes the novelty of this test.

The card lies at the bottom of a box like that of an old-fashioned stereoscope, but larger. In front of the card, at a distance of 6 or 8 inches from it, I fix a sheet of perforated zinc, and the observer looks through a short tube in the top of the box, containing a convex lens of about 8 diopters, focussed on the zinc. The card is so far beyond the zinc that it is necessarily out of focus, even for those possessing full power of accommodation, all that can be seen through the holes being merely the colours, which form a mosaic of coloured dots, not unlike those of Professor Stilling's test, from which, in fact, I got the idea.

But the method has this advantage over Stilling's cards—given the colours, any design can be painted in a few minutes. It is astonishing how soon the exact description of a test-card becomes known if many people from the same neighbourhood are tested ; hence the importance even in the absence of any conscious attempt to deceive the examiner, of being able to vary the lettering.

A year later, Lieut.-Col. Scott said that the colours were no longer a match, and he could even read the red letters through the perforated zinc. On close inspection there appeared to be a sort of whitish bloom on the surface of the vermilion, but so very slight that few people would have noticed it. He found that fresh vermilion still matched the green, as did the old after the application of oil. From this it would appear that the green was unchanged. The whitish bloom would represent to him an addition of blue, to which he was exceedingly sensitive.

2. For the next card the pigment selected was geranium red, which differs from vermilion by the addition of blue and violet, these colours being distinct to Lieut.-Col. Scott. This was found to match with a sort of French grey or slate-colour with no tendency to green. On the grey half of the card I painted GO in blue and NOT in geranium. The first word he could see at a glance, but the second was invisible to him, although to me it was more conspicuous than the other.

3. For the third card we took emerald green, mixed with a little yellow, to cut off some of the blue rays. This was found to match with a rather rich yellow ochre, made with Mars yellow, Oxford ochre, and a little burnt sienna. The letters P.T.O. were painted in the yellow ochre mixture on the green, and R.S.V.P. in emerald green upon the yellow ochre background.

He could not see either, the whole card appearing one uniform green to him. But he immediately detected the letters O.K. upon the green and A.B.C. and Z upon the yellow ochre in a salmon-pink made by adding a very little geranium-red to the yellow ochre, instead of the burnt sienna.

4. For a fourth card we made a full-toned lilac with mauve, magenta and zinc white. The colour by which this was matched was a fairly pure blue quite free from any tint of purple, but showing in the spectroscope a good deal of green. On the lilac half I painted P.K.W. in blue, and on the blue half the letters X and I in a slighly paler blue, made by mixing a very little more zinc white with the ground colour. The difference is so slight that very few people can trace these letters through the perforated zinc, although they see the letters P.K.W. immediately.

Lieut.-Col. Scott, on the other hand, could not detect P.K.W. and the whole card appeared of one uniform bright blue tint to him, but he instantly perceived the letters X and I. I have noticed this same sensitiveness to depth of colour in other cases of red-blindness.

Complete or nearly complete red-blindness is immediately detected by these cards Partial cases can sometimes read the letters, but do so with difficulty. Green-blind people easily read the first three, but are stopped by the fourth, being unable to distinguish between lilac and the greenish hue.

The apparatus has been in use in Oxford for colour-testing ever since we made it, and answers admirably. We found that the X and I on No. IV were easily visible to all the cases of red-blindness, but not to the green-blind nor the normal.

With regard to the permanence of the colours, we found in 1908, *i.e.*, after five years, some slight changes had taken place in all but No. I, which had not altered after being oiled. In No. II the geranium had lost something of its blue and violet components, and in No. III the yellow mixed with the emerald green had faded, so that Lieut.-Col. Scott, who knew what to look for, could just make out the lettering. But other colour-blind people were still deceived, and No. IV. was as effective as ever with both the red- and the green-blind.

All test-cards, especially such as Nagel's and Stillings, are liable to deteriorate, but the use of the perforated zinc enables fresh designs to be prepared with so little trouble that this objection is easily remedied in our test-cards. It is much to be desired that someone who is green-blind, or has otherwise abnormal colour-sensation, would prepare a set of cards with as much care and accuracy as Lieut.-Col. Scott did these for red-blindness.

Most of the testing was done in the Physiological Laboratory, Oxford, some in University College, Reading, and some were cases from the Oxford Eye Hospital. The expenses, which were trifling, were defrayed out of the Government Grant Fund.

SELF-DESCRIPTIVE TEST-TYPES

BY

Ernest E. Maddox, F.R.C.S. Ed.

BOURNEMOUTH, ENGLAND.

SOME distant test types which I had painted for me some two or three years ago have proved so satisfactory in use ever since that they may be worth describing, and the more so since I have been able to get Messrs. Meyrowitz to manufacture them, although not yet quite as designed. Their advantages are threefold.

1. The letters are so selected as to automatically indicate or confirm their own visual value, so that no need exists for small figuring between. It is sometimes convenient to go through a refraction seated with the back of the surgeon toward the types, and there is a certain sparing of a mental process if the letters pronounced by the patient inform him of their own value. The first three letters are the terminal ones of sixty, thirty-six and twenty-four, the next three being the initial letters of eighteen, twelve and nine. I cannot think of any way of making them all initial but find that after a little practice this arrangement works quite as well.

It is well to place an I after the N, because N is an unusually difficult letter. I now therefore combine N with what is perhaps the easiest letter in the alphabet, and which also conveniently happens to be the second letter of the word nine. The six metre line contains three letters, SIX., which contribute lines in all directions, so as to be suitable for the correct setting of a low cylinder in cases having full vision. The letter F in the corner is to ascertain those who have 6/5, but not for the purpose of setting their cylinders. For slightly amblyopic patients the letter T is the best for the setting of oblique cylinders, the Y and X being best for vertical or horizontal cylinders.

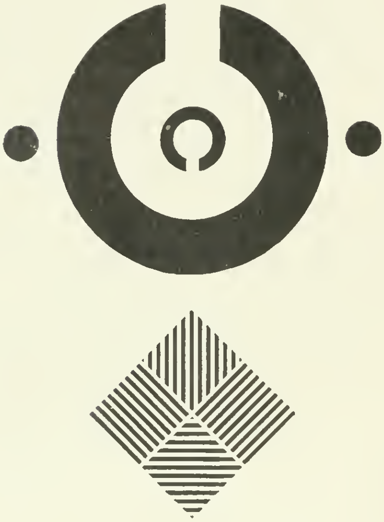
2. The letters wherewith the chart commences, viz., Y and X (when printed plain, and without knobs), are by a happy coincidence the very best to call attention to the presence of oblique astigmatism. It is extraordinary how sensitive patients are in discerning which is the blacker of the right and left hand branches of a uniform Y, and they will often remark upon it without being asked. Such an observation not only reveals the presence of some still uncorrected astigmatism, but also indicates in which direction the axis of the cylinder should be rotated. The human eye, indeed, always perceives any peculiarity more readily in familiar, than in unfamiliar objects, and with some patients letters like Y elicit astigmatism better then charts of stripes, though with intelligent subjects the latter present immense advantages.

The letter X is a good one to follow the Y, since it confirms the impression already given.

3. A great saving of time is effected by having one letter only in each line of the test types, except the last one or two. The patients read them quickly down and speedily reach the working line. I was first indebted to Mr. Priestley Smith for advising me to employ fewer letters than usual in the distant types.

This chart is sufficient for nine-tenths of routine work, and can save many hours of that valuable time which is little more than wasted when patients persist in struggling through long lines of letters. Nevertheless it is wise to have another, ampler chart ready for use in special cases, as for example, when the letters are learned too quickly, and an ideal arrangement would be to suspend beneath this chart one of those boxes of type which reveal one line at a time on the calendar principle, the lettering of which could also be made suggestive of the visual value of each line on the same self-descriptive principle.

Near Test Types.—The ordinary test types employed are needlessly voluminous, and the subject matter being sometimes of interest to patients, they are tempted to go on reading longer than is necessary for the purpose. Moreover, in reading portions of literature, a certain amount of guess work enters into the power of reading. A further waste of time is occasioned by the act of the surgeon, when he looks at the type to record its numerical value, and since the test types are not always immediately at the surgeon's hand a second or two may be spent in fetching and taking them back to their usual resting place. These losses of time, each insignificant in itself, are worth saving when a large number of patients has to be seen, amounting collectively to a good many hours in the year. For this reason, I have had some test types constructed for the waistcoat pocket, which can be brought out with the least delay. The lines are brief, and the sentences not usual ones, so that one word does not suggest the next, save in the very smallest, which serves to remind the refractionist, when a beginner, how to record the value of near vision,



THREE

TWO MET

ONE AND A HALF

DISTANCE ONE METRE

EIGHTY SENT HIM EATERS

SIXTY DITTO NOW GO DOWN

FIFTY CENTS OR HALF A METRE

PLACE THIRTY THREE BELOW THE LINE AND GREATEST
DISTANCE ABOVE IT

Near Test Types.

The subject matter of each line conveys to the refractionist's mind the visual value of that line, so that he need not himself glance at the types. As the patient reads them down, the size of the types is thereby read out. This self-descriptive principle will, I think, be found as helpful for near vision types as for distant ones.

It may be allowable to point out a possible inadvertency in the use of such types, namely, that visual acuteness in near vision, and the "near point" are sometimes confounded by students of refraction. To measure visual acuteness we should not only find the smallest type legible, but the *greatest* distance at which it can be read; whereas in measuring for the near point we find the *least* distance at which it can be read. In recording visual acuteness the greatest distance at which the type can be read forms the numerator, while the distance at which the type is normally legible contributes the denominator. When visual acuteness is recorded by J_1, J_2, and the like, we only really put down the interesting fact that the patient can read *somehow* type thus described, but the visual acuteness is not thereby recorded. For example, a presbyope who can read J_1 at half a metre has four times the visual acuteness of a young emmetrope who can read it equally well at (but not further than) 12 or 13 cm. The same criticism applies to the use of Snellen's near types when they are only recorded as ·6 ·8 etc. In practice the fallacy has less in it, because we generally know the age of the patient, and the visual acuteness as already recorded from distant types, but there are cases in which the contraction and displacement of the pupil which occur in near vision, render the visual acuteness for distance and near, not identical.

For convenience in visiting when distant types are not to hand, I have added two of Landolt's broken rings, one of which should be normally seen at 6 metres and the other at 25 metres. The fraction of these distances at which they are respectively visible, expresses the visual acuteness as usual.

Two green spots have been placed on opposite sides of the larger ring, as a test for tobacco amblyopia, the patient being directed to fix his attention upon the centre of the smaller ring, with one eye closed, and compare the appearances of the two greens. In tobacco amblyopia the green on the temporal side appears, of course, more washed out than the other, if its colour be distinguishable at all.

A striped diagram is also supplied to enable astigmatism to be measured in near vision, never, of course, to replace its more important static measurement in distant vision, but to ascertain whether the act of accommodation alters its amount or axis, as it so frequently does, through contraction and displacement of the pupil, altered curvature and position of the lens, or cyclotropia, but I must refrain from a digression into this interesting and important subject.

The near test types have been made for me very well by Messrs. Reiner & Keeler, of Vere Street, London. W. on celluloid sheets.

NOTES FROM SOME PARIS EYE CLINIQUES.

BY

SYDNEY STEPHENSON,

EDITOR OF "THE OPHTHALMOSCOPE."

Introductory.

PARIS contains hospitals of two classes, namely, those financed and controlled by the Assistance Publique de Paris, and those not dependent for their support upon that municipal body. The Hotel Dieu and the Hôpital Lariboisière are examples of the former, and the Fondation Rothschild and the Quinze-Vingts of the latter. The hospitals which belong to the Assistance Publique derive their patients from specified districts and suburbs of Paris, while the other hospitals observe no such restriction. Many of the institutions controlled by the Assistance Publique have ophthalmic departments, some of considerable size and importance. Among these may be mentioned the Hotel Dieu, Lariboisière, Baudelocque, Boucicaut, les Enfants-Malades, Laënnec, and Saint-Antoine.

There is yet a third kind of institution of special interest to eye surgeons, the private Cliniques, as those of Abadie, Landolt, Darier, A. Terson, Antonelli, Jocqs, and others. These are purely personal concerns, receiving patients from all parts and of all classes, each of whom, unless he be extremely poor, is expected to make a contribution in accordance with his means. These Cliniques receive no assistance whatever from the public funds. Some of them have a few beds. As regards equipment, they are not, of course, to be compared for a moment with the hospitals maintained by the public funds. They are, in effect, efficient out-patient departments, well equipped, and often controlled by men of European fame. They are not so common in Paris as was once the case, since most of the larger general hospitals, as already explained, now possess special eye departments.

In certain of the Paris hospitals an attempt is made to separate septic from non-septic cases, not only as regards in-patients, but also as regards out-patients. This is carried to the highest pitch at the Lariboisière Hospital and at the Fondation Rothschild. For example, on entering the last-named institution, septic cases are at once referred to a special pavilion. If the case be of a serious nature it is taken into the septic wards, but otherwise the patient is told to attend daily, or less often, in the special out-patient room of the septic pavilion. There he is looked after until discharged as cured. This feature, we believe, is peculiar to Paris.

In Paris, as in most other great cities, there appears to be no lack of hospital abuse, judging from the number of well-dressed patients seen in the dispensary departments. This was more obvious, as it seemed to us, in the institutions not under the control of the Assistance Publique. In this connection a recent incident is perhaps worth recording.—A well-to-do patient entered the Quinze-Vingts, where cataract was removed from his eye. The fact was brought under the notice of Dr. F. Cosse, the energetic secretary of the *Syndicat Général des Oculistes Français*, a body somewhat corresponding to our Medical Defence Union. The *Syndicat* thereupon addressed an energetic protest to the Director of the Hospital in question, who, with the authorisation of the Minister of the Interior, demanded one thousand francs as *dommages-intérêts* from the whilom patient. Rather than face legal proceedings, the latter satisfied the claim, of which one-half was awarded by the Minister of the Interior to the *Syndicat*.

The English or American ophthalmic surgeon will receive a hearty welcome wherever he goes in Paris. It is only necessary to attend on the operation day, and to present one's visiting card to the chief, in order to be made free of the place for the time being. Nothing but the greatest courtesy and cordiality will be met with. Little English, however, is spoken. Hence, in order to reap anything like full benefit, the visitor will do well to have a fair working knowledge of the French language.

The more important places can be seen well under a week by anybody who makes a wise disposal of his time.

Useful information may be gleaned from *Les Hôpitaux et Hospices de Paris*, revised annually, and published by Ch. Jarlot et Cie., 14, Boulevard St. Michel, Paris (VI^e), from whom the brochure can be obtained for one franc.

In the following pages details will be given of some of the more important places, public and private.

I.—Hotel Dieu.

This general hospital, founded in the seventh century, is situated in the Place du Parvis Notre-Dame, adjoining the noble Gothic pile of the famous Cathedral.

The present spacious building was opened in July, 1877, so that it is less than forty years old. It contains 607 beds, of which 56 are devoted to eye cases under the charge of Dr. de Lapersonne, who is also the professor of clinical ophthalmology in the Paris Faculty of Medicine. He is assisted by Drs. Coutela, Cerise, and Chenet. The ophthalmic department, as at present arranged, is curiously and inconveniently split up, the operating theatre and men's wards being on one side of the spacious quadrangle, and the women's ward and the out-patient department on the other side.

Out-patients are seen daily at 9 o'clock a.m. Operations are performed on Tuesdays, Thursdays, and Saturdays at 9.30 o'clock a.m. A clinical lecture is given every Friday at 10.30 o'clock a.m.

The out-patient department calls for no extended notice. It consists of the usual suite of rooms, and is provided with a small laboratory, chiefly, so one gathered, for the examination of specimens from the conjunctiva. More serious pathological work is conducted in the general pathological department of the hospital. A somewhat striking statue of Panas, for thirty years the professor of ophthalmology, adorns one of the rooms of the out-patient department.

The operating theatre, when we visited it, was a busy and, it must be added, a very noisy scene. Upwards of twenty persons were present. It is a room of considerable size and great height, lighted by two large windows looking into a courtyard. Its floor is tiled, and its walls are tiled and distempered. It contains two operation tables (one of wood), used alternately. A small but powerful electric lamp, held by an assistant, is employed during operations. The patients are clad in linen gowns, and their faces and shoulders are covered with linen cloths, leaving merely an aperture for the eye which is to be operated on. Professor de Lapersonne attaches great importance to a final cleansing of the eye whilst the patient is actually on the table. To this end, he rubs the eyelashes vigorously with a dossil of cotton wool, and, after that, douches out the conjunctival sac with normal saline. The Professor and his assistants are, of course, gowned, but neither caps nor masks are worn. No objection is taken to other persons entering the room *en tenue de ville.* One observed rings on the fingers of several of those engaged in the operations. Cocaine, adrenaline, etc., are contained in small glass receivers, provided with exit tubes, which are sterilised in the flame of a spirit lamp, immediately before the contents are allowed to drop into an eye.

Instruments are boiled, but used dry. The process of sterilisation is carried out in the theatre, there being no separate room for the purpose. There are small metal containers for the dressings, which are sterilised in an autoclave.

Leading from the operating theatre are two small rooms, the first containing, among other things, an apparatus for transforming the alternating into the constant current for use in the modified Volkmann's magnet found in the theatre, and the second (small and dark) being used for the storage of instruments, dressings, and drugs.

On the occasion of our visit, we saw Professor de Lapersonne perform five operations, *viz.*, one cataract, two iridectomies, one capsulo-muscular advancement for convergent squint, and, lastly, one electro-cautery for tubercle of the conjunctiva. The patients were nervous and most troublesome, but the accomplished operator brought every case to a successful conclusion.

The operations finished, Professor de Lapersonne adjourned to the lecture hall, a fine room leading from the operating theatre, and capable of seating some 150 listeners. Here he demonstrated colour photographs of external eye diseases and of pathological specimens by means of a projection microscope and lantern. The superb collection of pictures is almost worth a visit to Paris to see.

II.—L'Hôpital Lariboisière.

This general hospital, one of the largest in Paris, situated not far from the Gare du Nord, contains 1,086 beds, of which 48 are devoted to eye cases. The service is directed by Dr. Victor Morax, who is assisted by Drs. Magitot, Andrieux, and Carlotti.

Out-patients are seen at 9 o'clock a.m. on Mondays, Tuesdays, Thursdays, and Fridays. Operations take place at 9.30 a.m. on Wednesdays and Saturdays.

The eye department of the Lariboisière Hospital is comprised in a separate pavilion, constructed in the gardens of the institution. It is the first hospital in Paris to be provided with such an arrangement. The buildings of the eye pavilion were commenced in 1904 and completed in 1909. They cost, exclusive of the land on which they stand, about £37,720, according to Dr. Morax.

The general appearance of the building, as seen from the Rue Maubeuge, is shown in figure 1. It is arranged in three floors, of which the *rez-de-chaussée* is devoted to waiting rooms, examination rooms, refraction rooms, dark rooms, a small operation theatre for septic cases, laboratories—in a word, to the accommodation of a carefully-designed and well-arranged out-patient department.

The operating theatre, with its annexes, occupies one end of the first floor, the rest of which is devoted to the accommodation of women and children.

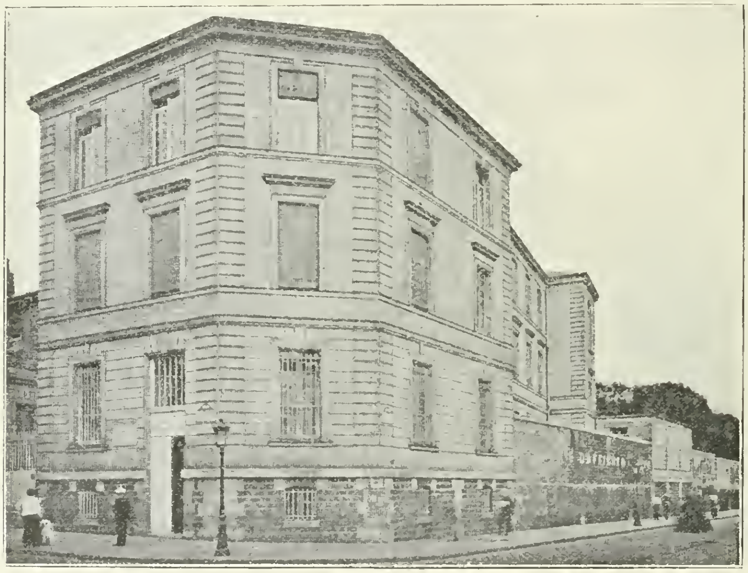


FIG. 1.

Male patients occupy the second floor. In addition to all this, the basement of the ophthalmic pavilion includes a couple of rooms, one for microphotography and the other for colour photography.

Before they are admitted to the operating theatre, visitors are provided with linen overalls, kept in a small adjoining apartment, the library, fitted with shelves, tables, and chairs. This department includes three rooms *en suite*—namely, the theatre itself, a sterilising room, and an anæsthetic room, which is also used as a dark room for magnet extractions and so forth. All these rooms have tiled floors, and the walls are lined to a height of about six feet with tiles, the upper part of the walls being coated with Parian cement.

The operating theatre (16 feet by 20 feet) is fitted with three large clear windows having a northern aspect and overlooking the garden of the Hospital (Fig. 2). There is no top lighting, and consequently an absence of annoying reflections from the cornea of the eye that is to be operated on. The operating table, a simple but efficient affair constructed wholly of metal, stands close to the windows. It is much after the pattern employed by dentists, and its movements are rendered smooth by the usual oil pump arrangement. A pantostat allows the city current to be employed for the galvano-cautery and for other medical purposes. Sterilised water is drawn from the apparatus installed in the adjoining or sterilising room. This well-appointed operating theatre contains, of course, the usual lavabos, tables for instruments, solutions, and anæsthetics.

Dr. Morax and his first assistant wear linen gowns and small linen caps, but no gloves. The assistant was provided with a mask. Everybody in the theatre had a linen overall. During the operations we were fortunate enough to witness, additional light was afforded by a small but powerful electric lamp held by an assistant.

One useful adjunct to the theatre may be mentioned.—On one of the walls of the room was a frame, some 36 by 42 inches, containing a plate of translucent glass, behind which were coloured outline representations of various parts of the eye. This allows a sketch to be very quickly made when needed for explaining the nature of an operation. The device is, of course, that familiar to everybody in the child's drawing slate, but the adaptation is somewhat novel.

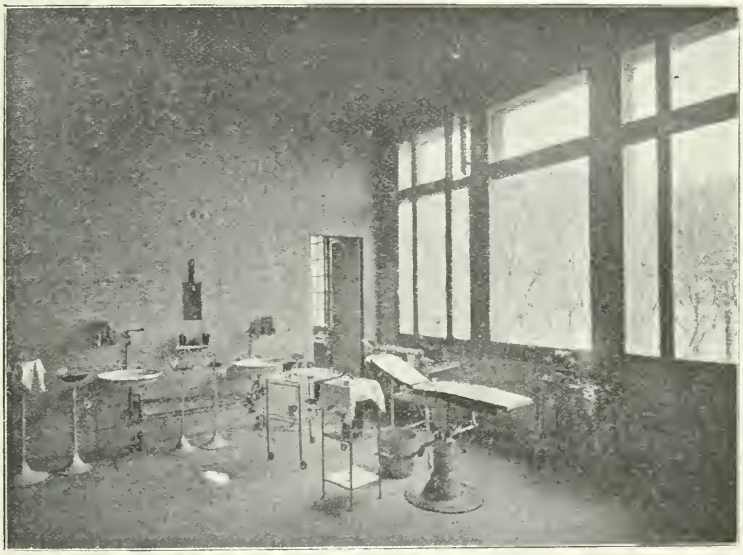


FIG. 2.

The sterilising room contains upon a bracket a couple of cast-iron autoclaves for the sterilisation of water by the aid of steam under pressure from the central pavilion of the Hospital. Each of these receptacles contains 500 litres of water, and is connected with the operating theatre. The room also includes arrangements for sterilising nail brushes, instruments, dressings, collyria, solutions intended for injection, and sutures. On the eve of operations, the instruments needed for each particular patient are placed in a small metal container provided with a lid, and put into an electric steriliser (made by Lequeux and Goisot) at a temperature of 160° to 170° C. Dr. Morax, questioned as to the effect of this treatment upon the edges of cataract knives, replied that he had no complaint to make. At the same time he had never employed any other plan, and so had no means of reaching a comparative judgment.

Dressings, tampons, towels, collyria, etc., are purified in an autoclave at a temperature of 120° C. Separate metal containers for dressings are employed for each patient. Included in each of these receivers is a small Chamberland-Morax glass flask, which holds about one ounce of saline solution. One end of the flask is plugged with a mixture of benzoic acid, salicylic acid, and methylene blue, a combination the normal colour of which, a green-blue, is changed by heat to a deep-blue. One has, therefore, a simple method of telling whether a given flask has or has not been exposed to the temperature necessary for efficient sterilization. The fact may be noted that such needles and sutures as may be needed for each operation are placed in metal boxes for sterilization, the several layers being separated from one another by discs of paper.

An incubator serves to keep the solutions to be applied to an eye in winter at a temperature of from 30° to 35° C.

Finally, the two glass cabinets in this room contain only instruments and appliances sterilized and ready for instant use in cases of emergency. That, as Dr. Morax points out, is one of the great advantages of sterilisation by dry heat, since instruments cleansed in that way do not oxydize, and, provided the box in which they are contained be not opened, they remain aseptic indefinitely.

The anæsthetic room is fitted with an operating table and a Volkmann's magnet. Its single window can be wholly obscured by means of metallic shutters, thereby allowing of the extraction of foreign bodies and some of the more delicate operations on the eye to be performed by artificial light.

The wards were bright and cheerful. Their walls are painted with white "Ripolin" paint, and the furniture is also painted white. No attempt is made to exclude sunlight, which on the occasion of our visit, was streaming brightly into some of the rooms. One small ward is devoted to the reception of babies with ophthalmia neonatorum, accompanied by their mothers. As already stated, women and children are lodged on the first and men on the second floor of the Hospital. There are more beds for men than for women.

A few words may be usefully devoted to describing the arrangements of the out-patient department situated on the *rez-de-chaussée* of the Hospital. The waiting room, spacious and well lighted and provided with iron furniture painted white, is divided by a partition into two parts, one for such patients as are suffering from external diseases of the eye, and the other for those with deeper affections or who require glasses. To the former division are attached a couple of *boxes d'isolment*, so that general infective disease, in particular measles and whooping-cough, may be kept apart from all other patients. The presumably septic cases are dealt with in a special consultation room, to which is attached a small laboratory for the rapid examination of specimens. More complete examinations, calling for cultures, inoculations, and so forth, are conducted in the research laboratory, which is easy of access from the smaller laboratory. The non-septic cases are dealt with in another consultation room, whence patients, if necessary, are passed on to the refraction department.

The refraction room, which measures 30 feet by 27 feet, contains seats for patients and several pulpit-desks fitted with boxes of trial lenses, coloured wools, optotypes, and stereoscopes. On the opposite walls are test-types (Parinaud-Snellen), and types for children and illiterates, illuminated by transmitted electric light. In the case of new patients, the subjective investigation, as carried out in this room, is always preceded by examination with the ophthalmometer, retinoscope, and ophthalmoscope.

These various examinations are conducted in the adjoining dark room, a spacious apartment, which measures 24 feet by 18 feet. Its walls are painted dead black, and its floor, like that of the *salle de réfraction*, is covered with black and white tiles. It is fitted with eight ophthalmoscopic lamps, separated from one another by iron partitions, some five feet in height. In connection with each lamp are to be found a concave and plane mirror and a magnifying glass, fixed by means of chains, so that they can scarcely be taken away by accident. "*Ce dispositif est très économique*" is Morax's ironic comment upon this arrangement, and we can well believe it. The walls of the dark room, which also contains a Javal's ophthalmometer, are hung with ophthalmoscopic plates.

A second and smaller dark room (about 18 feet square) leads from the one just described, and is intended for the utilisation of certain special apparatus, such as the Czapski binocular loupe, the demonstrating ophthalmoscope of Thorner, and Polack's registering perimeter.

Before leaving the refraction department of the Lariboisière Hospital, some mention must be made of the *Salle de Diplopie*, which leads from the *Salle de Réfraction*. It is quite dark, and is about 15 feet square. On the far wall are painted nine white squares, and at the meeting point of the lines which form these squares are candle-shaped electric glow lamps, actuated from the other end of the room where surgeon and patient stand, a distance of some thirteen feet from the patterned wall. The lamps may be switched on successively by the examiner. One of the patient's eyes is covered with a coloured glass disc, and he is then asked to describe the respective position of the white and coloured lights which he sees. His answers are recorded graphically on gummed slips of paper for immediate presentation to the *chef de service* and for ultimate insertion in the notes of the case.

Any description of the ophthalmological service of the Lariboisière Hospital would be singularly incomplete if it failed to say something about the laboratory arrangements, for which, indeed, the place is famed. The small clinical laboratory, attached to the consultation room for septic cases, contains all necessary apparatus for the examination of smear preparations from conjunctiva or cornea and for ultra-microscopic investigation. The laboratory, properly so-called, is another affair. It is a large room situated on the *rez-de-chaussée*, and well lighted by a couple of ample windows. A long enamelled table in the centre of the room allows several individuals to engage at the same time in microscopic and other work. The laboratory is fitted with microscopes, microtomes, incubators, centrifuges, electric stoves, and, in a word, with all the furnishings necessary to a well equipped modern laboratory.

Attached to the laboratory is a small *écurie d'animaux*, where rabbits, guinea-pigs, and other animals destined for inoculation purposes are kept.

Other annexes include in the basement of the pavilion a room fitted with apparatus for the photography of microscopic specimens, and near it another room for the development of photographs, as well as for colour photography by means of the magnesium light.

Considerable space has been devoted to the ophthalmological department of the Lariboisière Hospital, since it is the most recent in Paris, and from a foreigner's point of view, is quite the most interesting. Indeed, it may be said to represent the last word in Parisian ophthalmology and hospital construction.

Further details may be found in an article by the chief, Dr. Victor Morax, published in the *Annales d'Oculistique* for December, 1911.

III.—Quinze-Vingts.

This asylum, the entrance to the clinical department of which is situated at No. 13, Rue Moreau, is a very ancient foundation. The original foundation for three hundred blind pensioners (hence Quinze-Vingts, 15 by 20), constructed A.D., 1254 to 1260 by King Saint Louis, was essentially an almshouse, and it still retains that character. In addition to this, pensions of from one to two hundred francs are paid annually to blind people living in various parts of France.

At a comparatively recent date (May 9th, 1880) the foundation stone was laid of a hospital and dispensary for the treatment of diseases of the eye. Dr. Fieuzal was the first *médecin en chef*, and he was succeeded by Abadie and Trousseau. The medical staff now comprises four members—namely, Drs. Kalt, Valude, Chevallereau, and Chaillous.

The National Clinique is in the Charenton district of Paris, about five minutes' walk from the Bastile station on the Métropolitain. It receives patients from every part of France. Out-patients are seen daily at 2 o'clock p.m. Drs. Kalt and Chaillous work on Tuesdays, Thursdays, and Saturdays, and Drs. Valude and Chevallereau on Mondays, Wednesdays, and Fridays. Each member of the staff has an operating day. Thus, Dr. Kalt operates on Wednesday, Dr Valude on Thursday, Dr. Chaillous on Friday, and Dr. Chevallereau on Saturday.

One enters a central waiting room, of irregular shape and large size, fitted with lantern lights in the roof. Along one side is a counter, where the patients obtain their letters. Two extensive suites of small rooms, one on each side of the waiting hall, afford accommodation for the two surgeons who are at work on the same day seeing out-patients. These include consultation room, theatre for minor operations and dressings, room for the medical examination of patients, clinical laboratory, dark rooms for ophthalmoscopic purposes, and refraction rooms.

When we visited the out-patient department we were fortunate enough to be received by Dr. Kalt, whose dexterity in managing patients we had an opportunity of admiring for a couple of hours or more, during which time some seventy patients, many of them new, passed through his hands. Dr. Kalt always made a point of scrutinising the eyes closely before he asked a single question. His rapidity of external diagnosis was striking, and notes were made by him on the patient's card at the same time. He employed focal illumination in most of the cases, using for the purpose an electric lamp with a metal bonnet standing on the table at his elbow. The metal stand to which the lamp was attached allowed of up and down movements. The straightforward cases were prescribed for at once, interesting or obscure cases were referred for examination with the ophthalmoscope in the dark room, refraction cases were remitted to the proper department, and minor operations were sent into the adjoining room for treatment. The patients were admitted to the *salle d'examen* in batches of five, their numbers being called out by a porter stationed in the waiting hall, somewhat after the system adopted on the Paris omnibuses. This plan was probably necessitated by the fact that the room was provided with a single door for the entrance and exit of patients.

The usual prescriptions were printed on slips and classified according to their nature in a wooden rack standing on the desk close to Dr. Kalt's chair. The appropriate sheet was handed to each patient.

Under Dr. Kalt's direction, we visited the "septic department," separated from the rest of the building by an isolating staircase and corridor. It is intended for the accommodation of septic cases coming up to the out-patient department, such as trachoma, ophthalmia neonatorum, hypopyon-keratitis, and so forth, as well as for septic conditions arising among in-patients after operations on the eye. Its wards are arranged on the corridor system. There are four wards—namely, one for women, one for women and children, and two for men. The total accommodation amounts to forty-one beds and cots. Its wards struck us, it must be confessed, as rather comfortless and not too clean. The department also includes a largish dressing room provided with two doors, presumably meant for the two sexes.

The operating theatre of the Quinze-Vingts, a spacious apartment, is on the ground floor of the building, and is approached through one of the suites already described as intended for the out-patients. Its floor and the lower part of its walls are tiled. It is provided with a large window of clear glass having a south-westerly aspect, while at the opposite end of the room is a large window filled with ground glass. Two metal operating tables, fitted with oil pump elevating gear, are placed close to the window first mentioned. The room is lighted by a ceiling cluster of six ordinary electric lamps, and there is an electric pendant over each operating table. Four glass and metal instrument cabinets are arranged along one side of the operating theatre, and above each is the name of the surgeon to whom it belongs. A Volkmann magnet is to be seen in one corner of the room.

Leading from the theatre is a sterilising room, a retiring room, and a waiting room.

We visited the theatre on Dr. Kalt's operating day, and saw that surgeon perform several iridectomies for glaucoma and extractions of cataract. As well known, he advocates the employment in certain cases of cataract of a corneal suture of very fine and specially prepared cotton. He regards the suture as a great safeguard against prolapse of the iris, a precaution that he doubtless finds all the more necessary, inasmuch as he does not perform iridectomy as part of his cataract operations. The procedure is briefly as follows.—The speculum is introduced, and by means of a very sharp half-curved needle the cotton thread is passed in and out of the cornea near the limbus. The lower end of the suture is left free. The upper end, however, is first drawn out into a loop, and then the free end of the loop is inserted into the tissues a little beyond the corneal limbus. The incision, which must pass between the two sutures—that is, into the bight of the loop, is next made. The speculum is then removed. The anterior capsule is torn out by means of forceps, and after expression of the cataract, the two ends of the thread are tied, this bringing the edges of the wound into apposition.

As seems to be usual in Paris, the patients at the Quinze-Vingts were nervous and ill-behaved, possibly because the use of two operating tables turn by turn allows them to see and to hear too much of what is happening. The assistants did not strike one as competent enough for so accomplished an operator as Dr. Kalt. Finally, the rather pushful crowd around the operating tables did not give a stranger much opportunity for seeing exactly what was going on. A little re-arrangement seemed to us to be desirable in that direction.

IV.—Fondation Rothschild.

La Fondation Ophtalmologique Adolphe de Rothschild, to give the institution its full title, contains eighty beds. It is situated in a somewhat inacessible position overlooking the Parc des Buttes Chaumont on the north-eastern side of Paris. It lies at the angle formed by the meeting of the Rue Manin and the Rue Priestley. Bolivar station, on the Métropolitan tube-railway, is five minutes' walk from the Hospital. The Fondation is entirely free.

The history of the foundation of the institution has been traced by the first medical director, Dr. A. Trousseau, in the pages of the *Annales d'Oculistique* for 1905. Very briefly, Baron Adolphe de Rothschild, who died on February 7th, 1900, left munificent funds for the creation of a hospital devoted to the treatment of the diseases of the eye. Dr. Desmarres was nominated by the testator as director of the institution, or, failing him, Dr. Trousseau. Baron Rothschild expressly laid it down that the new institution was to bear as little resemblance as possible to a hospital or a railway station. How well the architects succeeded in translating the Baron's words into action can be gathered from an inspection of the accompanying figure 3.

Out-patients are seen twice a day at 9 o'clock a.m., and at 1 o'clock p.m., and, in addition, there is a service three nights a week (Mondays, Wednesdays, and Fridays) at 7 o'clock, in order to suit the convenience of the working classes. Operations are performed at 9 o'clock a.m. on Wednesdays and Fridays.

The staff is a large one. Dr. Dupuy-Dutemps is the director, in succession to Dr. A. Trousseau, deceased. Dr. Rochon-Duvigneaud is the sub-directon Other members of the staff include Drs. Spéville, Wuillomenet, Millée, Vigier, Zanrotti, Angilault, Perrosier, Dupree, Polack (refraction department), Mawas (pathological department), and Bittière (electro-therapeutical department.

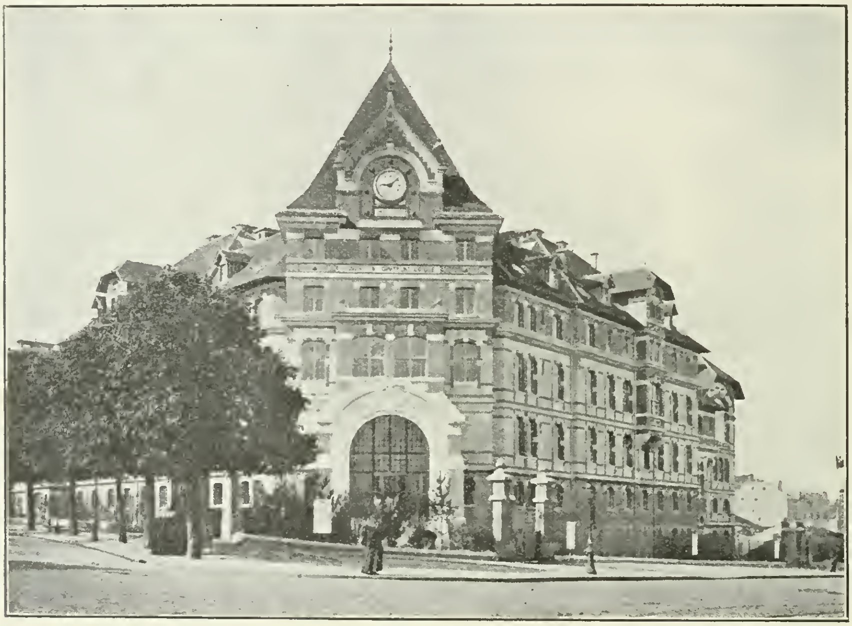


FIG. 3.

On entering the Hospital, out-patients are received by the porter, who directs them to go up the staircase to the first floor, where they sit in a well lighted, spacious, and cheerful waiting room. Patients' friends wait for their charges in a room on the *rez-de-chaussée*, for, very sensibly, patients cannot be accompanied by friends unless necessitated by age, invalidity, or blindness. From the *salle d'attente* the patient is drafted to this or that surgeon, of whom each is provided with a suite of rooms comprising a consultation room, a dark chamber for ophthalmoscopic work, and a theatre for minor surgery and dressings, reserved exclusively for non-septic cases. Septic cases are at once referred to the Septic Pavilion.

Four departments are common to the entire institution—namely, the *Salles de Réfraction*, the Pathological Department, the Operation Theatre, and the Electro-therapeutical Department. To each of the foregoing a few words of separate description may be usefully devoted.

1. The Operating Theatre and its Annexes.—These three rooms, which are upon the third floor of the building, are arranged *en suite*. The largest (27 feet by 24 feet), the Operating Theatre, claims our chief attention. It has a tiled floor, cemented and distempered walls, and is lighted by one large window facing north and a smaller one, which has a southern aspect. There is no top lighting. As to artificial light, there are three suspended glow lamps and a like number of bracket lamps. The room contains several metal operating tables, but is by no means encumbered by furniture of any kind. A Volkmann's magnet is provided. The theatre contains the usual modern arrangements for washing, and has an ingenious arrangement for delivering a fresh sterile nail brush to each operator.

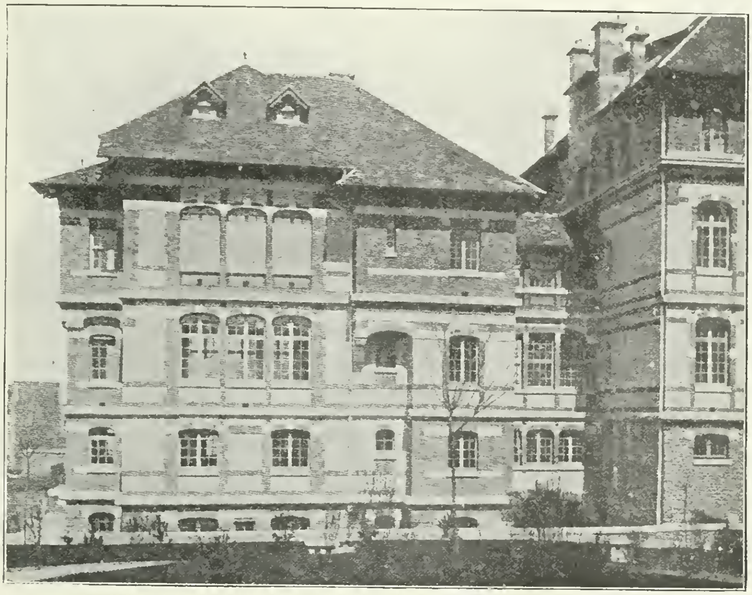


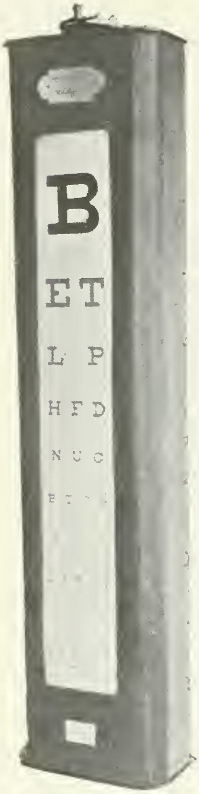
Fig. 4.

Leading from the operating theatre is a *Salle de Stérilisation*, fitted with autoclaves, dry heat sterilisers, and an apparatus for boiling instruments in oil of vaseline. A kind of glass window, called by the French an *armoire*, is let into the wall which separates the operating theatre from the sterilising room. Instruments disinfected in the latter chamber are stored in this wall cupboard, to be taken out, when required, from the theatre side. Instruments, are preferably sterilised by hot air (150° to 160° C.), to which they are exposed for one to two hours.

The third room in the suite is intended for the administration of anæsthetics.

2. *Les Salles de Réfraction*.—The refraction department, controlled by Dr. Polack, assisted by Dr. Chadeyron, consists of three inter-communicating rooms, situated upon the first floor of the Hospital. The largest is fitted with test-types, the *échelles optométriques* of de Lapersonne being much in evidence. This may be described as a long rectangular box, one side of which is missing (see figure 5). Different types are made to appear in the aperture by a simple mechanism, the essential features of which are two rollers enclosed within the appliance. The Rémy diploscope, boxes of test lenses, and other apparatus were also to be seen in this room. The adjoining room is darkened, and contains three gas lamps with mantles, a Javal and Schiötz ophthalmometer,

and Sulzer's *échelle murale*. In the third room, quite a small one, are to be found several scientific instruments, such as a colour perimeter, Thorner's demonstrating ophthalmoscope, Polack's electric perimeter, and Blondell's photometer.



3 and 4. The *Pathological Department*, controlled by Dr. J. Mawas, and the *Electro-Therapeutical Department*, under Dr. Bittière, are upon the *rez-de-chaussée* of the Hospital. The former appears to be very complete and well fitted up. It includes a pathological laboratory, a bacteriological laboratory, a chemical laboratory, a room for micro-photography, a special operating theatre, with separate instruments, for patients, specimens from whose eyes are to be examined in the adjoining laboratories, and, finally, a *Salle des Inoculations*, where guinea pigs, mice, rabbits, frogs, and other experimental animals are kept.

The Electro-Therapeutical Department contains apparatus for the localisation of foreign bodies in the eye, the taking of x-ray pictures, lamps for the light treatment of epithelioma, and many other things. As yet, however, there is no radium.

One of the most interesting features of the Fondation Rothschild is to be found in the Septic Pavilion, already mentioned when speaking of out-patients. It is lodged in a separate building, the general appearance of which is shown in the accompanying figure (4). The only communication between this and the central pavilion is by passage ways closed by locked doors, never opened except in cases of emergency. The Septic Pavilion has, of course, a separate entrance, and is provided with its own *concierge*.

The department consists of two floors. On the first floor we find a waiting and a dressing room for such patients as attend daily, having been recognised as suffering from a septic affection of the eyes when they first came to the Fondation. There are also two wards on this floor, each of six beds—one for men and the other for women. On the second floor of the pavilion we find a day room and refectory for septic patients, and a hall with ten cubicles leading from it intended primarily for the accommodation of babies with ophthalmia and their mothers. Each cubicle (Fig. 6), which is largely constructed of ground glass, contains a bed for the mother, a cot for the child, an enamelled iron chair, and a fixed washing basin provided with running water. Its floor is tiled, and it is separated from the cubicle on either side by a tiled and ground glass partition about seven feet in height. The second floor of the septic pavilion also includes a small room, provided with an operating table, where the babies' eyes are washed, cauterised, and so forth.

A library (26 feet by 15 feet) is to be found on the first floor of the main building adjoining the dispensary. Its shelves contain works on ophthalmology, and some of the more important ophthalmic periodicals are to be found on its tables. Two cases are filled with a fine collection of wax models, the work of M. Jumelin, of external diseases of the eye and its appendages.

V.—Dr. Landolt's Clinique.

This private clinique is situated at No. 27, Rue St. André des Arts, within a stone's throw of the famous "Boul' Mich." (Boulevard St. Michel). It was founded, and for many years directed, by Dr. E. Landolt, but it is now controlled by his son, Dr. Marc Landolt. Some 3,500 new patients seek advice here every year. The Clinique is open daily, and work begins at 12.30 o'clock p.m.

Turning out of the Rue St. André des Arts, one enters a somewhat picturesque courtyard, and the Landolt Clinique occupies three or four floors of the building on the right. The first floor consists of four rooms *en suite*—namely, a waiting room, a consultation room, a room where the records are kept, and the director's *cabinet particulier*. These various apartments are of good size, well furnished, and liberally provided with various instruments of precision. The operating room is on the third floor, and above that are beds for some ten to fifteen patients.

When we visited the clinique, we were fortunate to see both Landolt *père* and *fils*. Together with the assistants, Drs. Nadal and Giraudeau, they were in the operating room, a small apartment, measuring perhaps 15 feet by 12 feet, well lighted by a single draped window. The floor was covered with linoleum, and the walls were wainscoted to a height of about four feet and above that were painted. There was a modest glass instrument cupboard, an apparatus for supplying sterilised water (a kind of geyser), and the usual appliances for ablution. Under the window stood an ingenious yet extremely simple metal operating table, which can be obtained, for about £16 English, from Moria, Paris. Dr. Marc Landolt's table has several outstanding advantages.—(1) The deep concavity hollowed out on each side, and extending from the arm-pit to the hip, when the patient is on the table, allows the surgeon and assistant more ready access. When working from in front, this arrangement allows the surgeon to stand immediately opposite the eye to be operated upon. (2) The narrowness of the table facilitates the work of both surgeon and assistant. (3) The top of the table can be rotated on ball bearings around a central pivot,

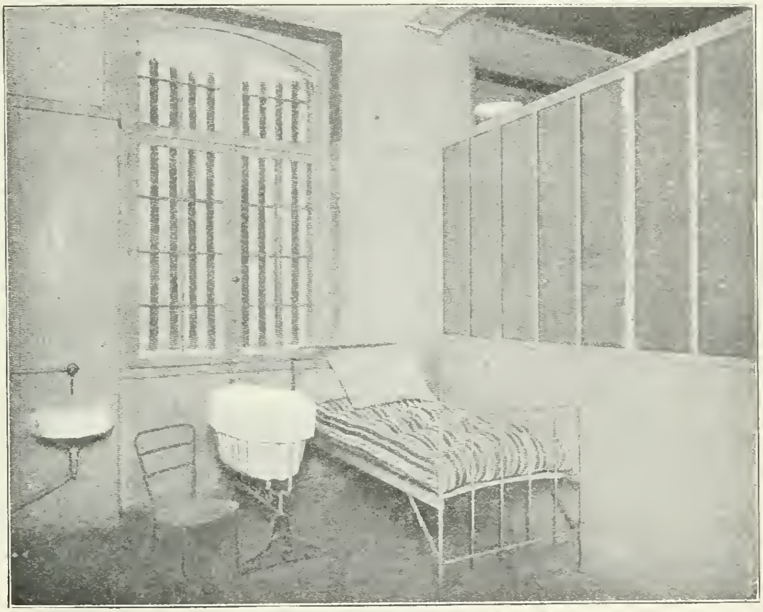


FIG. 6.

an arrangement whereby the patient can be twisted round, so as to bring either eye under the window without moving the entire table. (4) A hollow head-rest, that can be raised, lowered, or moved laterally, is provided. The sole disadvantage of Landolt's table that we could see was that its height was fixed.

A couple of operations were performed by Landolt *père* during our visit to the Clinique—namely, an iridectomy for glaucoma and an enucleation of the eyeball. After sterilising his hands, Landolt envelops them in loosely-fitting linen gloves until the moment of operation, when he takes them off. For the iridectomy, he employed his specially curved keratome, and the operation was uneventful. The enucleation was done under very imperfect chloroform narcosis. For this operation Landolt employed two pairs of scissors, both curved upon the flat but in different directions. No squint hook was used. With one pair of scissors, the ocular conjunctiva and all the straight muscles of the eyeball, with the exception of the superior rectus, were divided, and the latter was cut with the second pair of scissors. The globe was pulled inwards by the stump of the external rectus, left long for the purpose, the inferior oblique was caught up on the scissors, and, finally, the optic nerve was divided.

After the first operation, both eyes were covered with a shaped piece of gauze, and this, in turn, was covered with bits of cotton wool, arranged so as to protect the eyeball effectually against pressure—"to create a new orbit," as Landolt put it. One gathered that both eyes were kept bandaged for eight days after advancement for strabismus.

The operations finished, Landolt *père* demonstrated the case of a patient whose left inferior rectus he had advanced two weeks before. The result was practically perfect, for the man had recovered binocular vision at a distance of about three feet, and diplopia could be elicited only when the head was turned to the right. This case led to some interesting remarks on ocular paralysis in general. Landolt next demonstrated the numerous improvements he has made in almost all the instruments employed by oculists. But these are now so well-known to English ophthalmic surgeons that they need scarcely be discussed in this place. They were fully described by Landolt *père* in the recent Bowman Lecture of the Ophthalmological Society of the United Kingdom, delivered on June 7th, 1911 (for abstract see THE OPHTHALMOSCOPE, January, 1912, p. 49).

Altogether, one may spend a most profitable and instructive afternoon in this Clinique, and the pleasure of the visit is heightened by the fact that Landolt *père* speaks excellent English, and is, besides, the soul of geniality.

VI.—Dr. Darier's Clinique.

The Clinique controlled by Dr. A. Darier, which receives from 2,000 to 3,000 patients annually from every part of France, as well as from foreign countries, is situated at No. 9 Rue Buffault (Faubourg Montmartre). Owing to the name of the street, the Paris *cocher* seldom takes one to the right spot. The stranger is just as likely to be landed at Rue Duphot, Rue Truffaut, or Rue Buffon, as at Rue Buffault, unless he specifically mentions the Faubourg Montmartre in his directions to the cabman.

The Clinique is open daily for the reception of patients from 2 o'clock to 5 o'clock p.m.: operations are performed as they present themselves. It is lodged upon the first floor, and comprises some eight artistically furnished rooms arranged *en suite*. It is the head-quarters of our contemporary, *La Clinique Ophtalmologique*, edited by Drs. Darier, Jocqs, and Dor.

The operating room, although small, is adequately furnished with modern apparatus of good type. Indeed, the number of scientific appliances in the Darier Clinique is not a little remarkable when one considers that the entire expenses fall upon the shoulders of one man, but, then, he is an enthusiast.

Dr. Darier (a most impressive personality) is, as everybody knows, the exponent *par excellence* of new methods of treatment. He discusses each patient, not perhaps so much from the diagnostic standpoint, as from that of the cure of the disease. Each case in his hands becomes therefore the text for a little lecture, often pregnant with therapeutic suggestions. His acquaintance with the work of foreigners, and his width of view and liberality of mind are quite remarkable, and when to this we add his candour and his fluency and powers of expression in English, we have a combination that it is well worth going a long way to see and to hear. Darier believes in trying new remedies, and not in casting them aside without investigation merely because they seem on a first view unlikely to succeed. This was well seen on the day of our visit, when he treated a patient suffering from optic atrophy by Bier's suction. He was repeating the experiences of a German ophthalmic surgeon, who claimed to have obtained good results in such cases by those unlikely means.

Dr. Darier is a great advocate of radium in diseases of the eye. He employs it in rodent ulcer and epithelioma of the eyelids, in ocular neuralgia, in spring catarrh, and, curiously enough, in chalazion. In the last-named affection he finds that a couple of applications, each of twenty minutes duration, made at intervals of a fortnight, suffice to cure many cases without recourse to operation. The Clinique is well supplied with radium.

Much tuberculin is employed in the Darier Clinique. Ordinarily, B.E. is used, but when that sets up local reaction, as is commonly the case in the eye, "Endotin," a Russian product, is substituted for it. At the same time, in Darier's experience, B.E. is the more active and convenient preparation.

It is hardly possible to visit the Clinique without seeing Dr. Darier make subconjunctival injections of this or that remedy. No instrument is employed except the syringe, which is provided with a curved, not a straight needle. His partiality for the intra-venous injection of the soluble salts of mercury, as the cyanide or the biniodide, is also well known. His adroitness in making these injections must be seen in order to be appreciated. No vein may be visible at the bend of the elbow, but, nevertheless, by the aid of palpation, Darier will make the injection unerringly.

The Clinique has a couple of beds only. Darier is of the opinion, however, that the hospitalisation of eye patients, as a rule, is unnecessary. He sometimes even sends a patient home after extracting a cataract in his Clinique. We were assured that no bad results were known to have followed this practice, which sounds somewhat hazardous to British ears.

CURRENT LITERATURE.

NOTE.—Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—OPHTHALMOLOGY AND GENERAL MEDICINE.

(FOURTH NOTICE.)

(1) **Brav, Aaron.**—A case of spontaneous thrombosis of the central vein of the retina following parturition. *Ophthalmology*, January, 1911.

(2) **Cushing, Harvey.**—Ocular paralysis in intracranial brain tumour. *Lancet*, 7th January, 1911.

(3) **Wernche, Th.**—On changes in the eyes during bubonic plague. (Ueber Augenveränderungen bei der Bubonenpest.) *Zeitschrift für Augenheilkunde*, Februar, 1911.

(4) **Steindorff, K.—On Barlow's disease, with especial reference to associated ocular conditions. (Ueber Barlowsche Krankheit mi besonderer Berücksichtigung der dabei beobachteten Augenerscheinungen).** *Zeitschrift für Augenheilkunde*, Februar, 1911.

(5) **De Lapersonne.—Exophthalmos and acute leukæmia. (Exophtalmie et leucémie aiguë.)** *Archives d'Ophtalmologie*, février, 1911.

(6) **Clarke, J Michell.—The Argyll Robertson sign in cerebral and spinal syphilis.** *British Medical Journal*, 11th February, 1911.

(7) **Hinshelwood, James—Two cases of hereditary congenital word-blindness.** *Lancet*, 18th March, 1911.

(8) **Peter, Luther C.—Arterial hypertension and its relation to morbid changes in the eye.** *Ophthalmology*, April, 1911.

(9) **Taylor, James.—Some ocular and visual conditions in medical cases.** *Lancet*, 22nd April, 1911.

(10) **Flemming, Percy. — Medical cases in ophthalmology.** *Clinical Journal*, 17th May, 1911.

(11) **MacCarthy, William H. L. — The early diagnosis of general paralysis.** *Dublin Journal of Medical Science*, 1st August, 1911.

(1) The patient, whose case is described by **Brav**, of Philadelphia, was a young woman, 19 years of age. Ten days after delivery, swelling of the feet came on, and at the same time she suddenly complained of blindness of the left eye. She was a delicate anæmic woman, suffering from endocarditis (mitral disease) with failure of compensation. The pulse was rapid, weak, irregular, and intermittent, and there was dyspnœa. Direct light reflex of the left pupil was poor. Vision of left eye—fingers at ten inches. The left disc was irregular and blurred in its outline, the arteries were narrow and pale, and the veins dilated and tortuous. The retina was covered with hæmorrhages. The patient died, and there was no necropsy. The author has found no record in literature of thrombosis of the central vein following labour.

A. J. BALLANTYNE.

(2) The *Lancet*, referring to an article by **Cushing**, in *Brain*, remarks as follows: "It has long been recognised that in cases of intracranial tumour weakness of one or both sixth nerves—sometimes even of the third pair—may be present in cases in which there is no reason to suppose that these nerves are directly involved in the growth * * * * In the last number of *Brain*, Dr. Harvey Cushing makes a valuable and suggestive contribution to the elucidation of this point, and as the result of a series of anatomical and pathological studies he submits the view that in certain cases at least the interference with the function of the sixth nerves, especially in cases of intracranial tumour, may be due to strangulation of these nerves by transverse branches of the basilar artery. In support of this view he finds that these arteries, contrary to the usual anatomical description, usually overlie the nerves, that in a series of cases of intracranial tumour the vessels which normally encircle the brain stem often produce a more or less deep grooving of the nervous tissues, that the sixth nerves in many such cases are deeply constricted, and that in a large percentage of cases in which there is found *post-mortem* grooving of the pons with implication of the nerves, there was recorded during life either subjective diplopia or the actual presence of a convergent squint."

ERNEST THOMSON.

(3) **Wernche** (Odessa).—The complications noted by Mizao are keratitis and irido-cyclitis with hypopyon, 1 case; central keratitis, 1 case; peripheral

keratitis, 1 case; keratitis, 3 cases; hypopyon-keratitis, 3 cases; kerato-iritis with hypopyon, 1 case; kerato-iritis, 1 case; corneal ulcer, 1 case; ring abscess of the cornea, 5 cases, of which 3 passed into panophalmitis; 11 cases of panophthalmitis, 2 of conjunctival hæmorrhage, and 12 of conjunctivitis. The author adds one more complication, optic neuritis.

T. HARRISON BUTLER.

(4) According to **Steindorff**, of Berlin, the alterations in the eye associated with scurvy-rickets are generally not mentioned in the text-books, even in those devoted to eye disease in children. The disease is very common in parts of Germany—in fact, since the beginning of the century it has appeared in almost epidemic form. In Italy, France, Switzerland, Finland, South Germany, and Austria, it is rare. In America, Holland, and North Germany, it is common. When the periosteum of the orbit is affected, exophthalmos is seen, generally accompanied by hæmorrhagic discolouration of the lids. These hæmorrhages are generally dark purple sugillations in the upper lids, like those seen in a fractured base. Petechiæ may appear on the lids. Subconjunctival ecchymoses have been described by Bendix. Hirschberg has noted retinal hæmorrhages. Katz has seen a complete hyphæma in a child in the Charlottenberg Hospital.

T. HARRISON BUTLER.

(5) In recording a case of acute leukæmia in a young girl who first sought advice on account of a unilateral exophthalmos, **de Lapersonne**, of Paris, considers the examination of the blood an important feature in most cases of exophthalmos. Of late years careful blood research has tended to differentiate the acute from other forms of leukæmia and to make of it a special morbid entity. A striking feature therein is the variability and inconstancy of the leucocytic formula, so that two acute forms having been described, one, a lymphoid type, with predominence of small lymphoid elements with large nuclei and a considerable increase of the adenoid elements and the lymphatic glands, and a second, myeloid form, where there is predominance of large mononuclear elements with ovoid or crescent-shaped nuclei and granular protoplasm, manifesting itself by bony affections or hæmorrhages. According to the most recent work (Boudet, 1910), the characteristic element in the leucocytic formula is a special leucocyte, a "stock" cell from which all others in their various transition stages are derived; this is the large lymphocyte of Ehrlich or the orthobasophite myelocyte of Dominici. It is a cell of 10 to 20 per cent. with round or oval nucleus and one to four nucleoli staining poorly with basic stains, the protoplasm very strongly basophile and showing no granules.

The clinical syndrome of Ebstein manifests itself—

1. By increase in size of the spleen, liver, and glands;
2. By pains in the bones;
3. By lesions of stomatitis and of angina with sphacelus, and
4. By hæmorrhages.

The progress of the disease and the histological reactions to which it gives rise in the conjunctival tissue, in the vascular endothelium, the bone marrow, the spleen, and the lymphatic glands suggest that acute embryonic leukæmia is an infectious disease, and from certain points in comparative pathology that it may be classed among those due to spirillæ.

In a review of the recorded cases, it is noteworthy that the clinical picture is far from uniform, for in some it is manifested by recurrent hæmorrhages, in others by bony affections, whilst in many the glandular affection is entirely wanting, and only the gravity of the general condition, with pallor of the skin, arouses attention. This was so in the author's case, which is as follows.—A young girl of 16 was sent to the Hôtel Dieu on account of a unilateral exophthalmos on the left side, which had begun rather suddenly two months previously. There were no personal or hereditary antecedents. The exophthalmos had attained its present proportions within eight or ten days from the onset, and then had remained stationary. There was bilateral sciatica, exaggerated knee-jerks, a doubtful Babinski, some urinary troubles, and slight increase of the thyroid on the left side, but no tachycardia.

The exophthalmos was not painful on direct pressure and was absolutely irreducible; movements of the globe were nearly normal.

In the supero-external part of the orbit could be felt an indurated mass, slightly flattened and extending beyond the orbital margin, whilst others could be felt more deeply placed. Ophthalmoscopic examination showed dilatation of the retinal veins and some haziness of the disc edges. There was no exophthalmos on the right side, but some ill-defined and deeply placed indurated masses could be felt in the upper part of the orbit. Beyond these signs, slight increase of the spleen alone was noted. The general pallor of the skin, however, led to a careful blood examination, with the result that the diagnosis of acute leukæmia was made. The leucocytic formula shewed the predominance of the large lymphocyte of Ehrlich. Within a few weeks of this, the general condition of the patient became worse, confirming the diagnosis, the exophthalmos grew more marked on the left side and also appeared on the right, whilst the indurated masses could be more easily felt. An attack of broncho-pneumonia supervening, the patient, at the request of the parents, was removed from the hospital in a very grave condition, and the ultimate result is not stated. Few cases of exophthalmos in the course of acute leukæmia have been recorded. BERNARD CRIDLAND.

(6) "The frequency and importance of the Argyll Robertson sign in tabes dorsalis and general paralysis is a matter of general knowledge, but there still seems some doubt as to its incidence in cerebro-spinal syphilis."

Clarke, of Clifton, Bristol, has recently made an analysis of 48 cases of syphilis of the brain, and 21 of the cord, 69 in all. The Argyll Robertson pupil was present in two of the cases of cerebal, and in two of the cases of spinal, syphilis. So far as his cases go they support the contention that this sign is not a symptom found in pure cerebro-spinal syphilis, and that its presence is an index of a degenerative process. Clarke suggests that the Argyll Robertson sign will be found associated with the group of pure degeneration of the pyramidal tracts, and that the condition is parasyphilitic rather than syphilitic. His results tally with the *a priori* presumption that such a sign is unlikely in cerebro-spinal syphilis. It is to be regarded as an example of the selective action of a poison upon the central nervous system. It may be compared in this respect with the action of the diphtheritic poison in paralysing accommodation. The parasyphilitic affections offer other examples of similar selective action of the virus, *e.g.*, the disease of posterior root fibres in tabes. But in cerebro-spinal syphilis, the paralyses are produced as the consequence of interference with the nutrition of the neurones by occlusion of vessels from endarteritis or thrombosis, by their compression by exudation, or by destruction through gummatous tumours. ERNEST THOMSON.

(7) The chief point is this paper by **Hinshelwood**, of Glasgow, is that the evidence is accumulating to show that hereditary word-blindness may assume a family type. At the Exeter meeting of the British Medical Association, 1907, Hinshelwood recorded four cases in one family. The two cases now recorded occur in the second generation of the same family. Reference is made to Sydney Stephenson's six cases affecting three generations of one family (see THE OPHTHALMOSCOPE, September, 1907), and to Herbert Fisher's case (*Ophthalmic Review*, November, 1905).

Hinshelwood holds that it is probable that in most cases of congenital word-blindness the condition is the result neither of disease nor of injury at birth, but of defective development of the visual memory centre occurring in the early stages of embryonic growth.

Pure congenital word-blindness, apart, that is to say, from cases where there is a general defective intelligence, and defect of other cerebral centres, can always be overcome by perseverance and proper methods of education. Herein lies the great importance of the recognition at an early period of the true character of such cases. ERNEST THOMSON.

(8) The conclusions of **Peter's** article are as follows.—1. Arterial hypertension is the chief cause of the eye-ground phenomena observed in chronic interstitial nephritis and arteriosclerosis ; 2. Similar vascular changes in the retina may be observed at times associated with higher blood pressure, before these diseases are diagnosed by other clinical symptoms ; 3. It frequently acts as a cause for subconjunctival hæmorrhage, and is so closely associated with glaucoma that it should be regarded as an active factor in the development of the disease ; 4. It probably will help to explain the phenomena of intraocular hæmorrhage after cataract extraction ; 5. In order to prevent the more serious eye conditions and to treat rationally, routine blood pressure studies should be made in all cases of intraocular disease not traumatic in origin. A. J. BALLANTYNE.

(9) The amount of personal experience which **Taylor**, of London, has packed into a few columns of the *Lancet* is so great that it is impossible to make a useful abstract. We must be content to state that the subjects taken up are.—1. Conditions of the pupil. 2. Conditions of ophthalmoplegia externa. 3. Changes in the optic nerve. 4. Retinal changes. 5. Hemianopia.

The paper will well repay perusal in the original. ERNEST THOMSON.

(10) In this paper, which was read before the Medical Society of London immediately after that of James Taylor on "Ocular and Visual Conditions in Medical Cases," **Flemming**, of London, excludes (with one exception) fundus cases and cases of nervous disease from the scope of his remarks. The subjects referred to are as follow :—1. The onset of myopia in people over 40 years as a sign of diabetes. The occurrence of myopia in patients over 40, whose lenses are clear, is very suggestive of diabetes. A patient, aged 50 years, who was wearing + 1.5 D. for reading, was sent to Flemming because she had discovered that she could see without her glasses. Her refraction was myopic, both lenses were clear, and examination of the urine revealed the presence of sugar, which up till then had not been suspected. 2. In cases of diabetes in which there is retro-ocular neuritis it is advisable, if the patient is a smoker, to try and get him to give up the tobacco. The author has seen a diabetic in whom vision improved from 6/36 to 6/9 in a little over four months. Although diabetes may produce typical retro-ocular neuritis apart altogether from tobacco, yet this condition is more often present when the patient is a smoker. 3. In patients over 45 years one frequently meets with a symptom which the author calls "morning ptosis."* There is no discharge from the lids and no definite paralysis. The patient may be in poor health. But the underlying cause in the majority of cases is the presence of uncorrected or insufficiently corrected presbyopia. Another cause, however, of difficulty in opening the eyes in the morning is angio-neurotic œdema of the eyelids. Some of the author's cases have seemed to be benefited by the administration of calcium lactate.

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* The phrase is to be found in Gower's *Diseases of the Nervous System.*—EDITOR.

Transient œdema of the lids may be caused by frontal or ethmoidal sinus empyema.

4. Cases of paralysis of the sympathetic are fairly common, and in some of the author's cases the paralysis has been confined to the pupil and eyelids, *i.e.*, sweating, not previously present, could be produced by pilocarpine. Irritation of the sympathetic is much rarer than paralysis. Apart from the use of drugs, Flemming has only seen one case. In this case there turned out to be early tuberculous disease of the pleura on the corresponding side.

5. The prevalence of atropine ophthalmoplegia where the drug has been accidentally or deliberately instilled is referred to. Persistent mydriasis after the use of atropine has been met with by the author in one case and he has read of another. [The reviewer knew of a case in the practice of a colleague and has never been able to forget the possibility every time he uses atropine.]

6. Ocular headaches.—Referring to the diagnosis, the author states that a very characteristic feature is that the patients wake up with the headache, which improves after breakfast, and may be absent during the day if the eyes are not much used, but will be increased or brought about by the use of the eyes for near work. The reviewer may point out, however, that another writer on this subject (Hinshelwood, *Lancet*, 18th February, 1911), states just as categorically that ocular headaches are generally absent in the morning. Such differences of opinion surely point to the necessity of not laying too much stress on the question of morning headache as a diagnostic feature. The crucial test, says Flemming, is the employment of atropine, although, admittedly, it cannot always be used.

6. Flemming has seen four examples of distinct double papillitis associated with paralysis of both sixth nerves. The combination occurred as a sequela of influenza and cleared up completely. The combination of papillitis with paralysis of the cranial nerve is most suggestive of cerebral tumour. In connection with the diagnosis the author attaches importance to the fact of the sixth being the particular nerve involved, because this nerve seems more prone to suffer in general toxic conditions than the other ocular nerves.

7. In connection with ophthalmic shingles, the author wonders whether there is a seasonal distribution of herpes zoster, and whether it can appear in an epidemic form ; also he has seen, what is very rare, a second attack in the same patient. ERNEST THOMSON.

(11) Examination of the pupils by **MacCarthy** in forty-one cases of early cases of general paralysis yielded the following results :—

Pupils equal and of normal size in 8 cases.
Pupils with bilateral myosis in 7 cases.
Pupils with bilateral mydriasis in 2 cases.
Pupils unequal in 24 cases.

The pupillary reaction was normal in 8 cases, sluggish in 13 cases, absent on one side in one case, and absent on both sides in 19 cases.

SYDNEY STEPHENSON.

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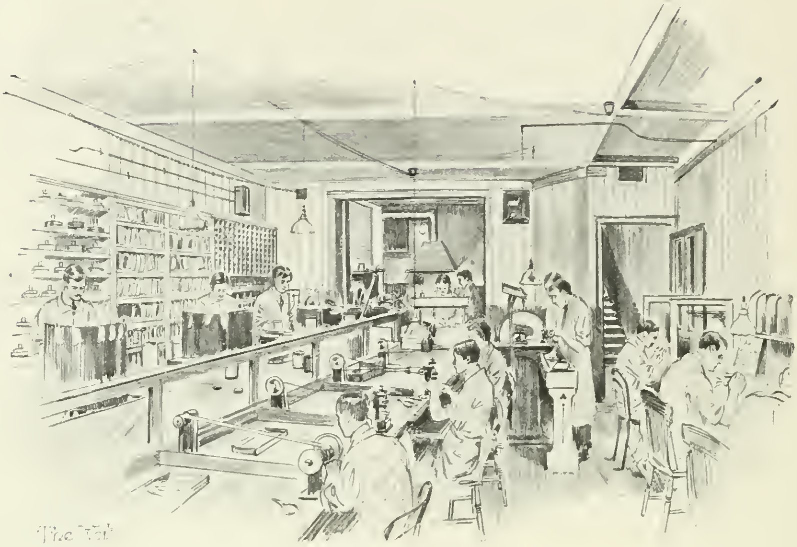

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The principle adopted is that of forming by alignment two triangles having their apices at the centres of rotation of the two eyes. By arranging these triangles so that they have one common point, and one common distance it becomes a simple matter to find the distance between their apices, which is the actual intra-ocular distance.

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II.—ÆTIOLOGY OF CHRONIC EYE DISEASE.

Wolff, L. K.—On the ætiology of chronic diseases of the eye. (Ueber die Aetiologie der chronischen Augenkrankheiten.) von Graefe's *Archiv f. Ophthalmologie*, Bd. LXXIX, 1 Heft, April 11, 1911.

By subjecting a fairly large number of eye cases from the eye clinic of Amsterdam to modern tests, **Wolff** tries to discriminate between syphilitic and tuberculous cases, some also proving of mixed origin. He tries to tabulate their distinctive clinical characters as follows:—

Keratitis.

SYPHILITIC.	TUBERCULOUS.
1. Cornea affected all over.	1. Cornea affected only in parts.
2. Typical deep vascularisation (after Hirschberg), rarely superficial or no vessels at all, never atypical deep ones.	2. Never typical deep vascularisation, often atypical or superficial one.
3. Rarely scleritis and never nodular scleritis.	3. Often nodular scleritis.
4. Mostly in people under 30.	4. As often after as before 30.
5. Rarely posterior synechiæ.	5. Often posterior synechiæ, even after energetic use of atropine.

The distinction between luetic and tuberculous iritis is easier, as the former is nearly always acute and the latter chronic; but the following characters favour the diagnosis of tuberculosis.—1. Very protracted course, often beginning after the thirtieth year. 2. Always many posterior adhesions of the iris; rather characteristic is the whitish thick band along the pupil; often secondary glaucoma. 3. Keratitis punctata, especially in a triangular field in the lower third. 4. Yellowish infiltration at the angle of the anterior chamber. 5. Vitreous opacities which are by no means more prevalent in syphilis. 6. Grey nodules and blackish atrophic islands in the iris. 7. Local reaction to tuberculine.

It is interesting that in one case where injections of neo-tuberculine failed, injections of bovine neo-tuberculine were eminently successful. Wolff now always tries the latter ones, where Pirquet's reaction is positive and injections of human neo-tuberculine prove inefficient. R. GRUBER.

III.—BACTERIOLOGICAL EXAMINATION PRIOR TO CATARACT EXTRACTION.

Heilbrun, C.—The practical value of bacteriological examination of the conjunctival secretion before cataract extraction. (Die praktische Bedeutung der bakteriologischen Untersuchung des Konjunktivalsekrets vor der Staaroperation.) *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1911.

Heilbrun (Erfurt).—Although valuable information may be gained from the examination of a smear preparation, it is always better to make a culture. An examination of 137 eyes showed that 65·5 per cent. contained the xerosis bacillus; 76 per cent the staphylococcus albus; 24 per cent. pneumococci; and 3 per cent. coli bacilli. Other bacilli and cocci were also found in a small percentage of eyes. The paper recounts cases in which these organisms were present before operation. The pneumococcus proved most dangerous; some strains of xerosis were not free from pathogenic action if they reached the vitreous, and B. coli was found to cause iritis. The author recommends that, wherever it is possible, an examination shall be made in every case before the eyeball is opened.

Discussion.

A most interesting discussion followed the reading of Heilbrun's paper, which contained nothing new or remarkable.

Axenfeld (Freiburg).—An examination should always be made. If it is not possible to examine the secretion by culture methods, at any rate a smear should be carefully searched for organisms. Every cataract patient should receive an injection of the Römer-Ruppel serum the night before operation. It might be well also to make a vaccine from the original culture and to inject it.

Elschnig (Prague).—The best way to disinfect the conjunctiva is by *lavage* with mercury oxycyanide solution, 1 : 2,000, and the use of pyocyanase. In two cases micro-organisms were overlooked in the cultures and the eyes were lost. The organisms were in one case pneumococci and in the other proteus.

Mayweg (Hagen) considered bacteriological examinations to be superfluous. They took up time and tended to make the patient anxious. He carefully irrigated the conjunctiva and the tear sac, cut a conjunctival flap, and gave a routine injection of diphtheria anti-toxic serum. He made as few manipulations as possible, and never troubled to try to express cortical masses, which were spontaneously absorbed. He did a discission on the tenth day and was very satisfied with his results. He has only had one infection among two hundred extractions. He had seen absolutely no effect produced by the use of Römer's serum in ulcus serpens.

v. Hippel had recently come to the conclusion that it was safer to make bacteriological examinations.

Sattler was strongly in favor of the examination of the secretion.

Gutmann (Berlin) thought that when the eye was clinically free from signs of infection it was unnecessary to examine the secretion. These constant *lavages* and examinations tended to upset the nerve of a patient.

Kuhnt (Bonn).—The careful *lavage* of the tear sac is of the greatest importance and should never be omitted. If there was any suspicion of infection, an examination should be made.

Haab (Zürich).—The greatest care must be devoted to the cleanliness of the conjunctival sac and lacrymal sac.

The opinion was general that in all cases the lacrymal passages ought to be syringed out before operation, and most of the members of the Congress who spoke considered that a bacteriological examination ought to be made.

T. HARRISON BUTLER.

IV.—HETEROCHROMIA.

(1) **Cabannes and Soulard.—Cataract and heterochromia in an infant. (Cataracte et heterochromie chez l'enfant.)** *Recueil d'Ophtalmologie*, janvier, 1911.

(2) **Galezowski, J.—Heterochromia of the iris, cataract and disturbance of the sympathetic. (Hétérochromie de l'iris, cataracte et troubles du sympathique.)** *Recueil d'Ophtalmologie*, mars, 1911.

(1) Cases of cataract associated with heterochromia iridis have generally

been in patients of 20 to 30 years of age, but those of **Cabannes and Soulard** were only 11 and 8 years old, and the disease had been in existence for at least two years previous to their examination by the writers.

In each case the healthy eye had dark and the diseased eye grey-blue iris. The visual results after operation were disappointing, in one case owing to extensive opaque nerve fibres, in the other, presumably owing to amblyopia ex anopsia. J. JAMESON EVANS.

(2) **Galezowski**, of Paris, records seven cases of heterochromia of the irides in three of which there was no cataract. In several cases there was also inequality of the pupils and palpebral fissures, and even in the prominence of the globes. In three cases there were signs of paralysis of the sympathetic on the depigmented side, and the author would be inclined to associate the chronic cyclitis and depigmentation with the paralysis were it not for the fact that in one case the depigmentation was associated with signs of excitation of the sympathetic on the same side. J. JAMESON EVANS.

V.—HEMIANOPSIA.

(1) **Coutela and Velter.—Homonymous hemianopsia by bullet wound, involving the fixation point. (Hémianopsie homonyme par coup de feu, a limite passant par le point de fixation.)** *Archives d'Ophtalmologie*, mars, 1910.
(2) **James, R. R.—A case of hemianopsia.** *Ophth. Review*, November, 1910.
(3) **Gonin.—On the blind visual field in hemianopsia. (Du champ visuel aveugle dans l'hemianopsie.)** *Ann. d'Oculistique*, janvier, 1911.
(4) **Re, Francesco.—Amaurosis of the right eye and nasal hemianopsia of the left eye of hysterical origin. (Amaurosi dell occhio destro ed emianopsia nasall dell' occhio sinistro de natura isterica.)** *Archivio di Ottalmalogia*, Vol. XVIII, Fasc. 10, Aprile, 1911.
(5) **Sherer, J. W.—Report of a case of optic atrophy, with horizontal heteronymous hemianopsia.** *Annals of Ophthalmology*, Vol. XX, July, 1911.
(6) **Henning-Rönne.—The significance of preservation of the macular field in hemianopsia. (Ueber die Bedeutung der macularen Aussparung im hemianopischen Gesichtsfelde.)** *Klin. Monatsbl. f. Augenheilkunde*, September, 1911.
(7) **Lohmann, W.—On the visual disturbance in hemianopsia. (Zur Sehstörung der Hemianopiker.)** von Graefe's *Archiv f. Ophthalmologie*, Bd. LXXX, 2 Heft, 7 November, 1911.

(1) A woman of 27 years received a bullet in the right occipital region fired point point-blank from a revolver. She lost consciousness for some minutes, and then was able to walk to the Hôtel Dieu, where a wound about 6 mm. in diameter was found situated 2 cm. from the mid-line and a little below the external occipital protruberance. Beyond slight headache, some vertigo, nausea, and vomiting, no signs were present except a left homonymous hemianopsia.

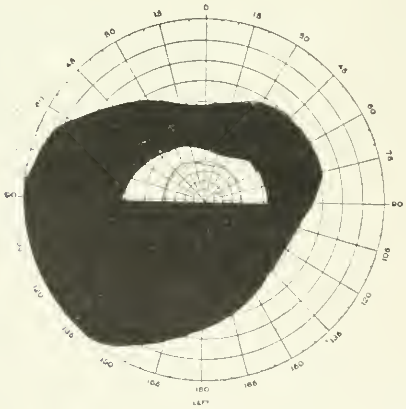
The following day the patient was trephined at the site of injury, and a little later a more detailed ocular examination revealed the following.—Complete left hemianopsia involving the left macular region, slight concentric contraction for both white and colours in the right halves of the fields, no perception of light in the blind areas. No other nerve symptoms were present. The bullet was removed twenty-five days after the injury, and the patient in due course recovered, except for the ocular condition.

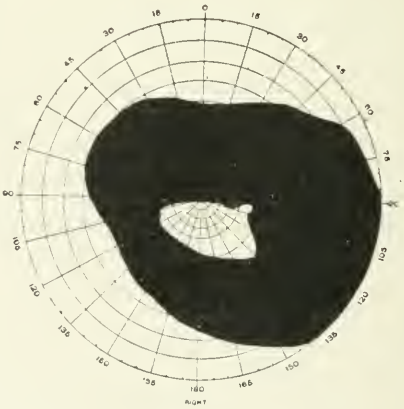
Some three months later, there was perception of light in the blind areas, and the right halves of the field became full.

The authors review similar cases published in the last thirty years, about twenty-five in number, and discuss the theories put forward to account for the involvement of the macular region. They incline to the "double innervation" theory first enunciated by Wilbrand. BERNARD CRIDLAND.

(2) **James,** of London, reports a case of a patient, aged 58 years, with difficulty in seeing on the right side of her, first noticed on getting about after recovery from injuries received in an accident by being thrown from the top of a 'bus and striking the right side of her head: she had sustained a fracture of the base of the skull with hæmorrhage from nose and right ear, and a right Colles' fracture, followed by unconsciousness for five days. The left pupil was larger than the right; the reactions were good. V. = 6/6 with either. There was right-sided homonymous hemianopsia, but no Wernicke's reaction. Fundi normal. He considers the condition as due to affection of the optic fibres behind the corpora quadrigemina, most likely in the occipital lobe. A. H. PAYAN DAWNAY.

(3) In 1905 Professor Bard, of Geneva, published an article,* in which he maintained that, contrary to the received opinion, luminous sensations persist almost to the limits of the blind field in cases of absolute hemianopsia, and that what really takes place is a singular dissociation of the perception of light from that of form, which in the future will have to be considered in the symptomatology of the affection and in its physiological interpretation. **Gonin,** of Lousanne, has repeated Bard's experiments, taking precautions to eliminate the fallacies arising from the presence of shadows, and the incidence of light on the side of the patient's nose or its reflection at the corneo-scleral margin, and has obtained results which lead him to conclude that Bard's arguments are not sufficiently conclusive to modify the classical conception of absolute hemianopsia.





(4) The patient whose case **Re** describes was a married woman of 33 years, who, since puberty appeared, had nervous attacks with convulsions at times, and at 19 years had a hemiplegia of the right side. The right eye became amaurotic during the second last pregnancy. Later, the left eye was complained of, and, on examination, was found to show the typical field of hemianopsia. The patient stated that the right eye was blind and that the left was very defective, but careful examination showed that binocular vision

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* *Semaine Médicale,* 31 mai, 1905.

was very satisfactory, as she could thread a needle, and Hering's test gave quite conclusive evidence. Other nervous phenomena were observed. The colour fields were taken and showed that (in left eye) white was largest, red next, blue next, and green smallest. LESLIE BUCHANAN.

(5) **Sherer's** patient, aged 50 years, was seen in November, 1910, and was then suffering from dim vision and severe headache. The vision of the right eye was 1/60, and this eye saw only the lower half of any object. The vision of the left eye was 6/15, and only the upper half of any object was seen.

The measuring of the visual fields shows the results upon the charts: Right—Form only. Left—Form and blue; yellow, red, and green absent. The pupils reacted to light; each disc was greyish and atrophic.

"The pathological condition is evidently that of optic atrophy and the ætiology specific." Under treatment (iodide of potassium) the headaches disappeared and the left vision improved from 6/15 to 6/9

JOHN WHARTON.

(6) **Henning-Rönne**, of Copenhagen, after stating the different explanations given to account for the preservation of the macular field in hemianopsia (Förster's theory of the greater vascularity of the macular cortex, v. Monakow's diffuse distribution of macular fibres in the cortex, Wilbrand's double representation of the macula, and Hirschberg and Schweigger's peripheral decussation in the retina), criticises them to show how they fail to explain all the cases. He points out that the definition of the phenomenon is itself not easy. It is not a well characterised phenomenon, and is difficult to separate sharply from complete hemianopsia, on the one hand, and partial hemianopsia, on the other. There are also wide differences in the amount of form and colour vision retained by the preserved macular area. The theory which the author offers is that hemianopsia with preservation of the macula is a special case of hemiamblyopia, in which, of course, there is relative preservation of function at the macula, the sensibility of the rest of the fundus being too low to give a response with the usual test objects. He supports his idea by a study of a number of cases which were found to represent every gradation from total hemianopsia to obvious hemiamblyopia with relative preservation of the macula. In Henning-Rönne's view, this theory explains most of the clinical phenomena with the fewest assumptions, and there is no important point which is opposed to it or is not explained by it. A. J. BALLANTYNE.

(7) **Lohmann** draws attention to two forms of visual disturbance in the hemianopic, which are little understood, and which are of considerable theoretical and practical interest. The first phenomenon was originally described by Axenfeld. It consists in an almost universal tendency to halve a line in such a way that the part towards the blind portion of the field is too small. Another functional symptom in hemianopsia seems to have hitherto escaped attention. It consists in defective power of localisation, vertical lines seeming to be shifted away from the blind half of the fields.

R. GRUBER.

VI.—OPHTHALMIA NEONATORUM.

(1) **Truc, H.—Anterior keratocele. Ampulliform corneal ectasia in ophthalmia of the new-born. (Kératocèle antérieure. Ectasie kératique ampullaire dans l'ophtalmie des nouveau-nés.)** *Revue Générale d'Ophtalmologie*, 31 mai, 1911.

(2) **Howe, Lucien.—The reporting of gonorrhœa as a method for preventing gonorrhœal ophthalmia.** *New York State Journal of Medicine*, July, 1911.

(3) **Dorland, W. A. Newman.—Intra-uterine ophthalmia neonatorum.** *Journ. American Medical Association*, October 14th, 1911.

(4) **Post, M. H.—Prevention of ophthalmia neonatorum.** *American Journal of Ophthalmology*, December, 1911.

(5) **Alger, Ellice M. — Some popular misconceptions regarding ophthalmia neonatorum.** *New York State Journal of Medicine*, December, 1911.

(1) The rare case of what is called "anterior" or "external" "keratocele," reported by **Truc**, of Montpellier, occurred in a new-born child, who had been treated carefully for ophthalmia. The child had gained weight, the discharge had practically ceased, and the more active treatment had been largely relaxed. A relapse took place, and the infant began to lose weight. Then a small prominence was noted in the centre of one cornea. This got bigger until it reached the size of a small grape and protruded between the lids. All the time there was no superficial ulceration. The swelling appeared to become tense when the child cried. Examined by oblique illumination, there was no anterior ulceration, but, on the other hand, there seemed to be, deep down towards the base of the staphyloma, a dark fissure. One obtained the impression of a large corneal bleb inflated by a small posterior opening in the membrane of Descemet. This corneal ectasia remained stationary for ten days, then became less transparent and slightly white. It rapidly flattened, until in the space of one week it had completely disappeared. The child's general condition improved and the increase in weight became normal. At the end of three months from the onset of the protrusion, there was a leucoma with slight adhesion of the iris. The pupil was almost circular, the media were transparent, the fundus was normal. The author thinks that, as in a localized keratomalacia, a failure of the nutrition of the infant was the primary cause of the ectasia. There was, in all probability under the influence of the set back in general nutrition, a softening of the cornea, and through some effort on the child's part, a breach was made in the membrane of Descemet which resulted in intralamellar penetration of the aqueous. Although there was at the commencement no superficial ulceration, a small ulcer did appear in the progress of the case—after the formation of the staphyloma—which accounts for the leucoma. Cure took place spontaneously through the closure of the posterior opening and the absorption of the contents of the corneal bulla.

The distinguished writer states that he was much perplexed as to the treatment in this case. Was he to compress, puncture, transfix, or resect the vesicle? He decided to temporise, merely employing *lavage* and the instillation of pilocarpine, and the result entirely justified the expectant attitude.

Truc believes that his case is unique so far as concerns the new-born, although anterior keratocele was known to Desmarres and others long years ago. Some detailed references are made by the writer to this early literature, but for this we must refer the reader to the original. ERNEST THOMSON.

(2) After telling (and eloquently telling) the oft-told tale of the ravages of ophthalmia neonatorum, **Howe**, of Buffalo, N.Y., urges that cases of gonorrhœa should be notified in the same way as other contagious diseases are notified. Some steps, it appears, have already been taken in the desired direction, since those in control of state institutions are empowered to report every case of

gonorrhœa observed therein. Expediency suggests that, as a start, notification of gonorrhœa should be confined to men and to such women who have *already been convicted of being dissolute.* At first, at all events, cases occurring in other females should not be notified. SYDNEY STEPHENSON.

(3) The case of prenatal ophthalmia neonatorum recorded by **Dorland**, of Chicago, belongs to the class where intra-uterine infection is rendered possible by premature rupture of the membranes. The facts follow.—In a woman, aged 24 years, the bag of waters ruptured one week prior to the onset of the labour pains. When born, the baby's eyes were found to present a profuse secretion of greenish pus, and were "the seat of an advanced gonorrhœal ophthalmia." Despite prompt treatment, carried out at a special hospital, one cornea perforated and was lost, while the other showed an almost complete opacity. Finally, it is interesting to note that the mother passed through a normal convalescence unaccompanied by fever.

SYDNEY STEPHENSON.

(4) **Post**, of St. Louis, advocates the employment of antiseptic vaginal douches in the first stage of labour, after examination of the maternal secretions for pathogenic organisms, for the prevention of ophthalmia neonatorum. He has seen severe conjunctivitis and "bad scarring of the cornea" follow the use of Credé's method, although such results would not have occurred if Credé's original instructions had been followed exactly. Nevertheless, Post believes that "any law would be criminal which required every physician to use 2 per cent. solution of nitrate of silver in the eyes of every child that he delivered." When all is said and done, the prevention of the disease is a duty that devolves, not upon the ophthalmic surgeon, but upon the obstetrician. SYDNEY STEPHENSON.

(5) In the course of an outspoken article dealing with ophthalmia neonatorum, **Alger**, of New York, points out that although the number of cases occurring in the practice of midwives is diminishing, owing to obligatory prophylaxis, the same remark is not true in the case of labours attended by medical men. To quote Alger's words :—"The reports of our ophthalmic hospitals and blind asylums have brought to light the astounding fact that a full half of the cases of ophthalmia have developed through the neglect of the family physician. Extensive investigations show that many physicians use prophylactic measures only in selected cases; while the great mass are taking no pains at all to prevent the disease." This almost criminal neglect has been ascribed to ignorance or to carelessness, but, in Alger's opinion, the cause is more closely connected with the general teaching that ophthalmia neonatorum is essentially of venereal origin. This leads the practitioner to reject prophylaxis as both unnecessary and indeed almost insulting to the parents of the baby. If it were possible to convince physician and mother that ophthalmia neonatorum is not of necessity a disgraceful occurrence, that it is due to the gonococcus in only about one-third of the cases, the medical man, so Alger thinks, would at once see the advisability of prophylaxis in every instance.

Neither is ophthalmia neonatorum always the grave disease it is commonly supposed to be. Drastic measures should be adopted only when really necessary. Even the advisability of hospital treatment, in the writer's view, is open to serious objection. For his own part, he never advises that step unless it seems certain that the baby will be neglected at home. Admission to hospital usually means separation of child from mother, a thing which is to be avoided at all hazards.

Treatment should be commenced without a moment's delay. The indications are for nutrition, cleanliness, and drainage. Interference should be confined to the smallest minimum possible. Alger's own practice is to instil a drop of silver nitrate, 1 per cent. into the affected eyes once a day, to sponge away any notable discharge from the closed eyelids, and to prevent the lids from "sticking" by the employment of oil or vaseline. Every three hours or so (seldom oftener) a drop of 20 per cent. argyrol is instilled. The presence of corneal complications calls for the additional use of atropine.

SYDNEY STEPHENSON.

VII.—REMEDIES.

(FOURTH NOTICE.)

(1) **Reuss, A. von.—Ophthalmological trifles. (Ophthalmologische Bagatellen.)** von Graefe's *Archiv f. Ophthalmologie*, Februar, 1911.

(2) **Buchanan, Leslie.—Some cases resembling atrophy of the optic nerves which recover under treatment.** *Glasgow Medical Journal*, February, 1911.

(3) **Culbertson, L. R.—Mydriatic ozœna.** *Ophthalmology*, October, 1911.

(4) **Goerlitz, Martin.—Affections of nerves after Salvarsan. (Salvarsan und Neurorezidiv.)** *Klin. Monatsbl. f. Augenheilk.*, November, 1911.

(5) **Streiff, J.—Tattooing of the cornea with gold dust. (Hornhauttätowierung mit Goldstaub.)** *Klin. Monatsbl. f. Augenheilk.*, November, 1911.

(6) **Alt, Adolf.—Three cases of ocular tuberculosis.** *American Journal of Ophthalmology*, November, 1911.

(7) **Brav, Aaron.—Interstitial keratitis with temporary total bilateral blindness ; Wassermann reaction negative ; tubercular reaction positive ; treated with tuberculin and mercury ; vision restored.** *Therapeutic Gazette*, November 15th, 1911.

(8) **Aubaret.—On the employment of the hot-air douche in ophthalmology. (De l'emploi de la douche d'air chaud en ophtalmologie.)** *Archives d'Ophtalmologie*, janvier, 1912.

(9) **Crigler, L. W.—Tuberculosis of the choroid after six weeks' treatment with tuberculin.** *New York State Journal of Medicine*, January, 1912.

(10) **Bradburne, A. A.—Acute plastic iritis markedly benefited by anti-streptococcus serum.** *Ophthalmology*, January, 1912.

(11) **Darier, A.—Acne rosacea of the cornea, its treatment. (Acné rosacée de la cornée, son traitement.)** *La Clinique Ophtalmologique*, 10 janvier, 1912.

(12) **Lacapère.—The action of Salvarsan in tabetic optic neuritis. (Action du Salvarsan sur la névrite optique tabétique.)** *Gazette des Hôpitaux*, 25 janvier, 1912.

(13) **Pitman, Marsh.—The antiseptic and germicidal properties of the silver salts and preparations.** *American Journal of Ophthalmology*, January, 1912.

(14) **Mitchell, L. J. C.—Rodent ulcer treated with CO_2 snow.** *Trans. Oph. Soc. U.K.*, Vol. XXXII, Fasc. 1, p. 80, 1912.

(15) **Bronner, Adolph.—Notes on three cases of ulcer of the cornea, combined with painful spasm of the sphincter pupillæ.** *Trans. Oph. Soc. U.K*, Vol. XXXII, Fasc. 1, p. 97, 1912.

(1) This paper refers to the diagnosis and treatment of keratitis dendritica. **von Reuss,** of Vienna, describes his method of double staining for the diagnosis of superficial defects. It is as follows.—First, a few drops of 2 per cent. cocaine, then the usual solution of fluorescein, repeated, if necessary, and followed by a thorough flushing of the conjunctival sac. If now no stain appears, the surface must be considered smooth, but otherwise von Reuss resorts to his method of 'double staining,' for which he uses either pyoctanine (1 : 1,000) or preferably methylen blue in 1 per cent. solution. Thus, the defect of the corneal parenchyma assumes a deep blue tinge, while its circumference, as far as only the epithelium is affected, appears green from fluorescein. This gives a much more accurate idea of the size and shape of the corneal erosion. It is very interesting to watch a case and to observe the very curious changes of the staining reaction which take place within a few hours. von Reuss feels inclined to consider keratitis dendritica and herpes corneæ as identical, and the absence of real vesicles as due only to the nature of the ocular tissues. For treatment he recommends the use of electrolysis in all cases which are not serious enough for the cautery. He applies the button-shaped end of a small needle electrode to the whole surface of the erosion, first stained as described, employing a current of 5-6 M.A. He finds this treatment very beneficial also in fascicular keratitis and similar cases. R. Gruber.

(2) None of the cases reported by **Buchanan,** of Glasgow, all in men between 30 and 50 years, exhibited signs or symptoms of toxic amblyopia. They were not addicted to the over-use of alcohol or tobacco. They did not show any evidence of digestive derangement, kidney disease, or syphilis. The symptoms were diminution of central vision, both for form and colour, and peripheral contraction of the visual field, generally symmetrical. The optic nerves presented the appearance of early atrophy, without diminution of the calibre of the central vessels. In none of the patients was there any evidence of nervous disorder. Some of them have been watched for several years, and have not developed sclerosis of the brain or cord. In none of the cases could any history be obtained of any similar disease in the family. There was nothing to indicate over-use of the eyes, malingering, or hysteria. The treatment was by strychnine and potassium iodide. In general, no improvement was noticed for a month or two, after which it was slow but steady. In the three cases given here in full, recovery was perfect eventually, both as regards the acuity and the field, but, in general, no improvement or alteration of the optic nerve was seen. The author asks the question :—" Are these cases of ordinary atrophy of the nerves which have been taken in time and prevented from reaching a stage at which treatment is of no avail? or are they a special class of case which would be amenable to treatment at any stage?

Ernest Thomson.

(3) **Culbertson** confirms the statement of Rhoads (*Ophthalmology*, July, 1911, see The Ophthalmoscope, February, 1912, p. 92), that a disagreeable odour develops in the noses of patients using atropine. He believes that the atropine dries the nasal secretions, and thereby allows of the growth of organisms, which produce the foul odour. A. J. Ballantyne.

(4) Many cases are already on record in which optic neuritis or paresis of motor nerves of the eye have followed the injection of Salvarsan, and the question is being keenly debated, whether these affections are, as the name "*neurorezidiv*" implies, of a syphilitic nature, or are evidence of the injurious

action of the arsenical drug. In the case reported by **Goerlitz**, of Hamburg, the patient, two months after syphilitic infection, received an intravenous injection of Salvarsan, and a second injection three weeks later. About five weeks after the second injection, paralysis of the left third nerve occurred ; another injection was given, and three days later, there was complete ptosis and third nerve paralysis on the left side, the vision of the right eye was slightly reduced, and the right fundus showed neuroretinitis with hæmorrhages and white patches, while the field of vision was interrupted by sector-shaped defects and a large absolute scotoma. A few days later, mercurial inunctions were begun, and conditions were practically normal in a month.

In forming an opinion as to the nature of such occurrences, one has to consider whether they are sometimes found in cases not treated by Salvarsan, and, if so, with what frequency. Statistics compiled before the introduction of Salvarsan, show that optic neuritis occurs in a fair proportion of syphilitics within a few months of the date of infection, but the investigations of Benario, and those of Géronne and Gutmann, prove that early affections of the nerves have been much more frequent since the introduction of Salvarsan. We are therefore dealing with a new element, which is in some way related to the employment of the drug in question. This is even more pronounced in the case of the affections of the motor nerves of the eyes, for in syphilis before the introduction of the new treatment, these were characteristic of the later stages. Moreover, the form of retinitis with hæmorrhages, found in Goerlitz's case, is very seldom found in this stage of syphilis, while somewhat similar changes were found after Salvarsan treatment in a case of Hesse's.

If the nerve affections were due to the drug, a continuance of the treatment would make matters worse, but in the reported cases recovery has usually occurred with repetition of the injections. Failure to do so in some cases does not necessarily prove that the condition is due to the drug, for it is recognised that the early nerve affections of syphilis sometimes show considerable resistance to treatment, or a tendency to repeated recurrence, even under other drugs such as mercury. It is unlikely that the conditions are due to arsenical poisoning, since affections of the optic nerves are rare in arsenical poisoning, and paralysis of eye muscles does not occur. Various authors speak favourably of the results of Salvarsan in syphilitic affections both of the optic nerves and of the motor nerves of the eyes. Indeed, its curative effect seems to be more pronounced in these conditions than in many other eye affections of similar origin. Goerlitz points out that the characters of the visual and field defects in the cases under discussion, support the conclusion that they are syphilitic and not toxic in nature.

But how are we to account for the frequency of these nerve affections, even assuming them to be of syphilitic origin? Ehrlich assumes that nests of spirochætes, especially in nerves enclosed in bony canals, like the cranial nerves, may escape the drug or receive an insufficient dose. Haike and Wechselmann add that the small amount of the drug which reaches these organisms may actually stimulate them to greater activity, and lead to the occurrence of neuritis. A similar explanation would account for the injurious effect of mercury in some syphilitic optic nerve affections. Sellei suggests that the Salvarsan sets free endotoxins of the spirochætes. Géronne and Gutmann believe that some alteration in the disposition of the nerve, or in the course of the syphilitic affection itself, is produced by the drug, and Goerlitz inclines to agree that Salvarsan produces a change in the type of the disease ; for it has apparently been responsible for the appearance, at an early stage, of lesions which we are accustomed to see only in the later stages.

For instance, after Salvarsan gummata have occurred as early as six months from the date of infection.

So far as the treatment of general syphilis is concerned, the occurrence of these nerve affections is of no serious significance, since they usually recover in the course of treatment. With regard to syphilitic eye affections, we are advised to be careful in the selection of cases for Salvarsan treatment, since its application is of doubtful benefit in most eye conditions. Stuelp recommends its use in cases which are refractory to mercury and iodide, or which bear these drugs badly, and in cases of ocular primary infection or in ocular secondaries which might lead to rapid loss of function. Goerlitz doubts the wisdom of applying Salvarsan in the last group of cases.

A. J. BALLANTYNE.

(5). **Strieff**, of Genoa, records a successful attempt to imitate, by tattooing, an iris of yellowish-brown colour. The eye presented a corneal leucoma resulting from small-pox in childhood. At a first sitting a dark spot was produced with Chinese ink to represent the pupil. At the second sitting the rest of the leucoma was tattooed to as close an imitation of the iris as possible by means of Chinese ink and gold dust, separately applied. Two or three further sittings were required to bring the surface to the proper colour and to complete the process. The result a year later was considered highly satisfactory. The gold employed was in the form of a gold pearl (used by painters and known locally as *perla d'oro vero*). This was simply moistened with 1-1000 bichloride, and applied in the same way as the Chinese ink, after removal of the epithelium.

A. J. BALLANTYNE.

(6). **Alt**, of St. Louis, reports three cases in young subjects where a supposedly tuberculous affection of the eye was more or less successfully treated with injections of tuberculin " B.F." (bouillon filtrate). In each instance the initial dose of the product was from 1/10,000 to 1/100,000 mg. and the final one 100 mgs., and 49 injections were made. The third case, one of interstitial keratitis followed, after an interval of some years, by scleritis and episcleritis, was probably due to a double infection by tubercle and syphilis.

SYDNEY STEPHENSON.

(7) In commenting upon this case (the nature of which is sufficiently indicated by the title of the paper), **Brav**, of Philadelphia, expresses a very confident opinion that interstitial keratitis is always of syphilitic origin.

SYDNEY STEPHENSON.

(8) **Aubaret**, of Bordeaux, has treated a number of more or less superficial eye diseases with the hot-air douche,* directed upon the closed eyelids or upon the open eye for five to ten minutes. For this purpose he has employed the *ventilateur électrique* of Lezy, of which he gives a cut. That appliance, however, being rather delicate, Aubaret has had an improved and more solid model constructed by Creuzan, of Bordeaux. The hot-air douche has been tried in cases of blepharo-conjunctivitis, keratitis, irido-keratitis, episcleritis, iritis, irido-cyclitis, and irido-choroiditis. Upon the whole, the results have been good, more especially in modifying pain.

SYDNEY STEPHENSON.

(9) **Crigler**, of New York, noted improvement in an eye affected with keratitis punctata, cloudy vitreous, and V. of less than 20/100, after the injection of tuberculin administered every other day for 54 days, no other treatment whatever being given. The initial dose of the tuberculin was 1-10,000 m.g., and the maximum dose, 1-200 m.g. V. improved to 20/30, the vitreous opacities disappeared, and an apparently extinct tuberculous

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* Bourgeois, of Reims, has employed hot-air in the treatment of ulcers of the cornea (*see* THE OPHTHALMOSCOPE, 1911, p. 458).

lesion was found in the choroid of the affected eye. It should be added that the patient, a female, was seventeen years of age; that her mother had died from pulmonary tuberculosis; and, lastly, that von Pirquet's skin reaction was positive. SYDNEY STEPHENSON.

(10) **Bradburne's** case has already been abstracted (THE OPHTHALMOSCOPE, 1911, p. 806).

(11) **Darier,** of Paris, gives an account of the literature dealing with rosea of the cornea, relates the facts of three more or less serious cases under his own care, and discusses the treatment of this troublesome affection. He recommends dionine followed after an hour by massage with yellow oxide of mercury ointment, or by applications of scarlet red (*rouge écarlate*). He recalls the experiences of Verhoeff and Holloway, who advise instillations of holocaine. Darier insists that relapses of the corneal disease can be prevented only by acting upon the general condition of the patient. He suggests that before long we may be in possession of an efficient vaccine obtained from the cutaneous lesions. Gaucher's lotion, which contains sulphur and talc mixed with glycerine and tincture of quillaia, applied to the face at night, is useful, and so is prolonged massage with an ointment of turbith mineral (4 grs.) and benzoated lard (30 grs.). In one of the cases narrated by Darier relapses of corneal rosea were accompanied by periorbital neuralgia, quickly cured by applications of radium. SYDNEY STEPHENSON.

(12) **Lacapère,** of Paris, reports encouraging results in two patients suffering from tabetic optic atrophy from the intravenous injection of Salvarsan. A further report is promised dealing with other cases still under treatment by the same means. The injections, although they do not actually cure the affection, seem to prevent its progress, while incidentally it may be said the Wassermann reaction becomes negative, and "lightning pains" disappear or become less pronounced. On several occasions, furthermore, Lacapère has seen disturbances of co-ordination become less marked in tabetics under treatment by Salvarsan. In ordinary cases the author commences with a dose of 20 to 25 centigrammes, and if the remedy is well borne, the doses named are sometimes augmented a little. He insists upon the frequent repetition of the injections given in series. Otherwise, the pains may reappear and the sight get worse. Finally, Lacapère believes that so far as the eyes are concerned, Salvarsan is an altogether harmless remedy.

SYDNEY STEPHENSON.

(13) **Pitman,** of St. Louis, has a very suggestive article based on work done at the Hygiene Institute, Berlin. The article is apparantly an abstract of a fuller one published in German, and suffers from extreme brevity.

There are two classes of silver albuminates. Firstly, those in which silver albuminates are present without free excess of silver nitrate, and, secondly, those in which they are present with excess silver nitrate. Collargol and argyrol belong to the first class. They are good antiseptics, but poor germicides. The word antiseptic is used by the author in the sense of growth-checking, but not life-destroying. In the second class are protargol, ichthargan, albargin, novargan, etc. These are strong germicides, killing staphylococci within minutes, whereas, the members of the first class take ten hours. While, then, the second class can be substituted clinically for dilute solution of silver nitrate without loss of power (although also without gain, according to Pitman), the first class cannot be so substituted.

The author points out that antiseptic and germicidal values proven on the gonococcus must be regarded with suspician, because the organism is so apt to die off in culture without apparent cause.

The silver preparations represent the widest known range of activity from absolutely *nil* through various antiseptic gradations to most powerful germicides —the range depending upon the combination in which the silver exists.

ERNEST THOMSON.

(14) **Mitchell**, of London, reports three cases of rodent ulcer of the eyelid successfully treated with carbon dioxide snow. In the second patient healing followed four applications of from thirty to sixty seconds each, and in the third patient eighteen exposures at intervals of one week, were required. In two of the patients zinc ions had been tried without result. Mitchell emphasises the importance of treating the edges rather than the base of the lesion.

SYDNEY STEPHENSON.

(15) In a peculiar class of case a superficial non-septic ulcer of the cornea, usually the result of traumatism, is associated with severe and intermittent pain and photophobia, which resist the ordinary methods of treatment for weeks or even months. The pupil in these cases does not respond to atropine, neither does the pupil of the other (non-affected) eye act as readily as usual. The painful symptoms are probably due to inflammation of the nerve-endings in the cornea, causing reflex spasm in the sphincter pupillæ muscle.

Bronner, of Bradford, gives details of three such cases, the symptoms of which speedily yielded to iridectomy.

SYDNEY STEPHENSON.

BOOK NOTICES.

Das Trachom nach dem gegenwärtigen Stande der Forschung. By PROF. G. STANCULEANU and DR. D. MIHAIL. Vienna and Leipzig: Joseph Safar. 1912.

In this *brochure* Stanculeanu and Mihail deal with the subject of trachomar in most, if not all, of its many aspects. Trachoma being one of those diseases which have hitherto baffled attempts at precise scientific definition, one always turns with interest to what is said regarding definition and differential diagnosis. The present authors have nothing new to offer in this connection. In the opening section they quote Saemisch's definition of trachoma from the clinical standpoint, as a chronic disease of the conjunctiva which leads to scar formation, and the pathological definition of Goldzieher, *viz.*, that it is a proliferative inflammation of the vascular layer of the conjunctiva in which the perivascular cellular infiltration is either diffuse or in the form of nodular granulations. Their summary of the present state of our knowledge regarding the "trachoma bodies" shows that an etiological definition of trachoma is still impossible. Coming to the interesting points involved in the differential diagnosis of trachoma from follicular conjunctivitis, the authors do not suggest that there is any difficulty in distinguishing these from each other. Follicular conjunctivitis is stated to be characterised by a ready response to simple treatment, by absence of conjunctival infiltration, by a greater degree of follicle formation in the lower fornix, and by the typical appearance of the follicles both to the naked eye and under magnification. The writers seem to lean to the acceptance of some degree of scar formation as a criterion of trachoma, which, of course, means the postponement of diagnosis in many cases until the results of treatment are seen.

In spite of the prevalent opinion that trachoma is essentially a chronic disease, and that a true acute form does not occur, Stanculeanu and Mihail maintain that trachoma *may* begin as an acute disease, and they describe this acute form under three varieties, *viz.*, the catarrhal, the follicular, and the bulbar form. The latter, which has not hitherto been described, is characterised by pronounced chemosis, hypertrophy of the plica and transitional folds, the presence of numerous punctate follicles scattered over the conjunctiva, and the occurrence of corneal complications in the shape of peripheral infiltrates or ulcers. All three acute types must, of course, be distinguished from other forms of acute conjunctivitis, and from chronic trachoma with secondary infection, by the negative results of bacteriological examination.

The largest section of the book is that devoted to treatment, and here the authors indicate their reliance, in all forms of trachoma, on "*brossage*," the introduction of which is credited to their countryman Manolescu. This method of treatment is described in some detail.

The remaining sections of the book deal with the history and geographical distribution of trachoma, pathological anatomy, clinical features, prophylaxis, etc. It can readily be understood that it is impossible to treat these exhaustively in a work of seventy odd pages, and it would be easy to point out omissions, but the authors have succeeded in presenting us with a readable and fairly complete and up-to-date survey of the subject.

A. J. BALLANTYNE.

Gesichtsfeld-Schema für Peripherie und Centrum. By Privatdozent Dr. GUSTAV FREYTAG, Munich. Leipzig: S. Hirzel. 1911. Price (Fifty Charts) 2 Marks.

Dr. Freytag's perimeter charts are surely the last word in detailed charting of the visual field. Each chart provides for four fields, right and left ordinary field and right and left central field. The latter charts are printed on the back of the former, and in such a way that, here also, left faces left eye and right faces right eye. The central field charts are on a scale four times that of the ordinary. In every available space of the paper surrounding the ordinary charts are headings of information which will throw light on all the circumstances at the time of charting. Thus, in addition to the usual name and date headings, we find the following:—diagnosis, visual acuity, time of the day, illumination, physical condition and mental attitude of the patient, and a scheme of recording, by means of dots, dashes, and such symbols, the colours investigated—seven in all. A heading for the size of the test object, and another for "Remarks." complete the details. The charts have been designed to correspond to the recording apparatus of the majority of self-registering perimeters: the largest circle has a radius of 50 mm. The meridians are numbered from 1 to 180, those in the lower half of the field being distinguished by the addition of the letter "u." Each chart is gummed at the edge, ready for sticking to the patient's record.

ERNEST THOMSON.

The Human Eye: Diagrams and descriptions illustrating its structures, functions, diseases and attachments, with special reference to it as an optical instrument. By J. GRAY-KEITH, formerly Assistant Optician to Her late Majesty the Queen. London: Sampson, Low, Marston & Co. 1912. 21s. net.

We have no idea why the author of this atlas-like volume, or his publishers, have sent their production for review in the columns of THE

OPHTHALMOSCOPE. We can conceive no circumstances under which it could be of any use to an ophthalmologist, yet there is no preface or introduction to show for whom it is intended. In any case, a worse investment for twenty-one shillings would, we venture to think, be difficult to find. We could excuse the crudity of the plates in a cheap book intended for the education of the young, but we cannot excuse the essential badness of many of the drawings in a volume published at a guinea. When we say that the drawings representing emmetropia, hypermetropia, and myopia, present the eyeball as varying only in convexity of lens and cornea in these conditions, that the drawing of aphakia makes it clear that after extraction of the lens the eye has no refractive power at all, and when he also remarks that in Plate 12 the choroid is stated to be placed next the fibrous layer of the retina, we have said all that is necessary in justification of the opinion that the work is absolutely of no interest to readers of this journal. We regret exceedingly that it has been sent to us at all.

CORRESPONDENCE.

[While THE OPHTHALMOSCOPE will at all times welcome correspondence from its readers, the Editor does not hold himself responsible for any views expressed in this column.]

TEARING OUT OF THE IRIS IN ABSOLUTE GLAUCOMA.

To the Editor of THE OPHTHALMOSCOPE.

SIR,

The translation of the article by Dr. Sameh Bey, on "Tearing out of the Iris in Absolute Glaucoma" (THE OPHTHALMOSCOPE, May 1912, page 273) quite takes away one's breath. It is indeed turning things topsy turvy when one finds the very procedure recommended as a cure which we have always been taught to regard as a cause of the same condition.

Three or four years ago I performed this operation by accident during the course of a cataract extraction, and the result was subacute glaucoma, finally requiring enucleation.

It must be that Dr. Bey gets a filtering scar.

I am,
Yours sincerely,
W. DUNCAN LAWRIE.

407, HUDDERSFIELD ROAD, OLDHAM,
May 6th, 1912.

SMITH'S CATARACT OPERATION.

To the Editor of THE OPHTHALMOSCOPE.

Sir,—Will you allow me space to answer Colonel Smith's letter, which appeared in THE OPHTHALMOSCOPE for this month.

(1) Colonel Smith "pleads guilty" to smoking a cheroot whilst operating, and adds "I defend myself by asserting that air breathed through a burning cigar is more sterile than air breathed through any mask, and much less in the way from the operator's point of view. For the same reason I allow my visitors to smoke. I have no undergraduates to keep in order, and none of my patients object."

(i) The air *drawn into the mouth* through the burning cigar does not enter into the question ; a mask is designed to protect the wound against the sprays of saliva which accompany the forced acts of expiration, such as speaking. I must ask your readers' forgiveness for explaining such elementary matters.

(ii) Colonel Smith may have no undergraduates to keep in order, but there are not a few amongst the younger surgeons in India who study and imitate his methods. It would be regrettable if they copied him in smoking during operations, for the habit is widely regarded as both slovenly and unsurgical, apart even from the fact that cigar ash drops from time to time into the wound area. I have had ocular evidence of this last occurrence.

(iii) " None of his patients object." How could they if they would ?

(2) Colonel Smith says, " He says I make mistakes in diagnosis. Again I plead guilty. Who does not ? The man who says he does not make mistakes is like the man who shoots a pigeon with every cartridge. He is either no sportsman or a liar."

I did not say that Colonel Smith," made mistakes." What I wrote I reaffirm, *viz.*, that " Before the reader has closed the book Dr. Vail has left on his mind the subtle suggestion that mistakes are avoided by Smith's ' unusual diagnostic ability.' " But the reviewer is not alone in his belief that an unusually large number of mistakes, some of them bad ones, are made under Jullundur conditions. I went on to give Colonel Smith credit for the work he is doing, but I considered it to be my duty, both as a reviewer and as a professor of ophthalmology in a large Indian university, to combat Dr. Vail's inference that such methods of carrying on ophthalmic practice are justified in this country in the Twentieth Century. I wrote as I did after carefully watching Colonel Smith at work, and I should have little difficulty in substantiating my statements.

(3) Colonel Smith corrects me in ascribing perchloride irrigation to Herbert and gives the credit to Colonel Bamber. I accept the correction with all the more pleasure, because it is, in my opinion, only right that this very valuable principle in ophthalmic surgery should be credited to no one but the surgeon who had the boldness to conceive it. Colonel Smith takes exception to a remark I made as to methods borrowed from other cliniques, and says that he owes little or nothing to other Indian cliniques and that he has not claimed that others have not used the same methods independent of or before him. This latter statement is entirely at variance with Colonel Smith's statement in September, 1905 ; " the details of the operation which I perform are my own." In view of his present attitude I wish unreservedly to withdraw the remark to which he takes exception, and the more readily so, because I desire to confine the issues to matters of scientific interest, excluding anything personal therefrom.

(4) Colonel Smith considers, and has said in at least one medical journal, that the home profession is against his method. He still holds that opinion, as is evident from his letter under consideration. No one who was at Oxford and Birmingham last year will doubt my assertion that any surgeon who will enter the arena for the intra-capsular operation with statistics prepared in the way usual amongst scientific ophthalmologists, will command a full and fair hearing.

(5) Colonel Smith says :— " I take the opportunity to explain the following point which has been brought to my notice by a friend. Men who are, he says, fair-minded, object to the statistics of my earlier papers, because they say that 98 PER CENT. of first-class results could not possibly have been obtained, as a certain proportion of the cases must have had indifferent fundi or other complication. Quite so. You cannot obtain a first-class visual

result, say 6/6, in cases with retinitis pigmentosa, choroidal changes, leucomata, etc., all of which were included in *my* 98 *per cent.* of cases. But *you can have a first-class surgical result, i.e., with as good a visual result as the conditions present before operation will admit of.* All the statistics of the Government hospitals in Northern India are based on the same plan and *I have always taken for granted that the meaning of the term first-class result was self-evident.* It is *impossible to test for a satisfactory visual result at the end of six, seven or eight days after operation.*" The italics are my own.

Colonel Smith has not quoted the figure correctly, and on exactness in this matter very much depends. He speaks of the comment excited by his claim to have attained 98 per cent. of first-class results. The actual figure was not 98 but 99·27, as will be seen from the following extract from his paper in the *Indian Medical Gazette* under date September, 1905 :

" Nos.	First-class results.	Second-class results.	Failures."
" 2616	99·27 per cent.	0·38 per cent.	0·34 per cent."

In the May, 1906, issue of the same journal, I criticised the various points of Major Smith's article at length, and in the course of so doing I wrote as follows :—

" Major Smith claims to have obtained 99.27 per cent. of first class results. Will he tell us what he means by first-class results? Jessop in his text-book, p. 237, reflecting London opinion, says : ' An operation is said to be a success when with glasses the vision is at least 6/36 ; a partial success when the vision is less than 6 60, and at least large objects ; and a failure if there is only perception of light ? ' "

Major Smith answered my criticisms in the August number of the *Gazette* in a paper occupying five columns of that journal ; but he left unanswered my challenge of his claim for results such as have never been seriously put forward by any surgeon before. On those figures largely rests the claim of Smith's method to occupy an altogether unique position in the surgery of cataract.

Colonel Smith s present explanation *five and a half years later*, is a notable contribution to the discussions which have taken place during the last few years, on the subject of the value of intra-capsular extraction. I leave it to the consideration of ophthalmologists without further remark than a wonder what under such a scheme he can have meant by ' second class results '.

I know of the method of compiling statistics in the Government hospitals of Northern India, but I should be sorry that your readers should for a moment infer that such reservations, as are here owned to, are the rule in other parts of India. The statistics that emanate from Calcutta, Bombay, and Madras have always been based on the ordinary principles accepted by ophthalmic surgeons all the world over.

Yours faithfully,

R. H. Elliot, Lt.-Col. I.M.S.

Government Ophthalmic Hospital,
Madras,
26th March, 1912.

"THE OPHTHALMOSCOPE" DIARY.

June.

4th. At Cheltenham, Midland Ophthalmological Society.

13th. Ophthalmological Society U.K.

July.

11th. Ophthalmological Society U.K. (Annual General Meeting).

18th—19th. At Keble College, Oxford, Oxford Ophthalmological Congress.

24th—26th. At Liverpool, the annual meeting of the British Medical Association, Section of Ophthalmology.

August.

3rd—5th. At Heidelberg, Ophthalmologische Gesellschaft.

20th—22nd. At Niagara Falls, Ontario, the American Academy of Ophthalmology and Oto-Laryngology.

THE

OPHTHALMOSCOPE.

A MONTHLY REVIEW OF CURRENT OPHTHALMOLOGY.

VOL. X.—No. 7.] *JULY 1, 1912.* [TWO SHILLINGS.

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ORIGINAL COMMUNICATIONS.

KERATITIS AS A CAUSE OF MYOPIA

BY

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IT IS usually acknowledged that the eyes of infants, say under one year of age, are uniformly, or almost uniformly, hypermetropic and that from this age onwards, through the early years of life, the degree of growth varies

Frequently, we find in two or more members of the same family departures from the normal that present a striking similarity in type and degree. These cases probably conform to some hereditary impulse, as do the size and shape of the nose, but there are many others in which we cannot find any evidence of transmission and where the ætiology is obscure.

The myopic type exists prior to school age, but as it becomes more and more prevalent with the duration of school work, the conditions thereof are accepted as having an aggravating or causal effect. Equatorial pressure from the cone-shaped arrangement of muscles, or from individual muscles, is recognised by many as being the principal ætiological factor. Others think the sclerotic in its posterior segment is, in myopic eyes, congenitally defective, as the yielding takes place posterior to the equator.

All this resolves itself into an inequality between the intra-ocular pressure and the resistance offered thereto by the unsupported part of the sclerotic.

Here and there a meagre acknowledgment is made of some relationship between corneal opacities and myopia. Corneal opacities are the remains of bygone inflammation, with or without ulceration, and if there is any relationship, it must in the first place be with the keratitis. Contraction is an inherent quality of scar tissue, and if the resultant scars, *per se*, influence the refraction one would anticipate hypermetropia rather than myopia.

Months or years after the attack, or attacks, of keratitis, these cases come to the refraction department with the mischief in its final or fixed form, seeking relief from their defects, and seeking it more or less in vain.

In order to investigate this subject, I have collected and tabulated a series of 100 consecutive cases of corneal opacities. Of these, 79 had both eyes affected, and the remainder had opacities in one only. In some cases the opacities were of old standing, and in others they were more or less recent in origin.

Age: 20 were from 3 to 10 years of age.
37 ,, ,, 11 to 20 ,, ,,
43 ,, over 20 years of age.
Sex: 49 were males.
51 ,, females.

Vision: of 200 eyes, *i.e.* taking the eyes singly and including the unaffected ones,

59 per cent. had very defective vision, 6/36 or worse.
29 ,, ,, ,, bad vision, 6/24 or 6/18.
12 ,, ,, ,, fair or good vision, 6/12, 6/9, or 6/6.

That is, 88 per cent. had very bad, or bad vision, and so were incapacitated from following any occupation where good sight is necessary.

Refraction.—200 eyes.

46 per cent. had myopic astigmatism, mostly compound.
21 ,, ,, ,, myopia.
2 ,, ,, ,, mixed astigmatism.
5 ,, ,, ,, hypermetropia.
20 ,, ,, ,, hypermetropic astigmatism.
6 ,, ,, ,, emmetropia.

The first three groups in this section added together give a total of 69 per cent., *i.e.*, practically 70 per cent. of myopia. This 69 per cent. of myopia was composed thus:

31 per cent. had under 1·5 D.
39 ,, ,, ,, from 1·5 D. to 4 D.
30 ,, ,, ,, over 4 D.

The average amount of myopia is a little over 3 D.

For comparison I introduce a reference to the incidence of ordinary myopia.

Some years ago I did some school inspection work in Lanarkshire, involving the examination of 2,181 scholars whose ages were from 7 to 13 years. Of myopia and myopic astigmatism I found 1·9 per cent., and of mixed astigmatism 3·5 per cent. These figures are deductions from a comparatively small number of scholars; but they are almost identical with those obtained by other workers in this country.

Randall, quoted by Parsons,[1] gives the following:—

Small children	2·2 per cent.
Before the commencement of schooling ...	6·5 ,,
During the first three school years ..	6·8 ,,
In young persons	11·4 ,,
Beyond twenty years	10 to 15 ,,

Some of these figures are drawn from German sources, and are probably too high for this country.

Even if it be granted that some of my cases are merely hereditary myopia with corneal complications added thereto, this can only apply to a few—unless it is insisted that myopia involves a special liability to corneal disease—and there remain sufficient to establish the fact that there is a relationship between keratitis and myopia, and that this relationship is greater than is usually acknowledged.

Astigmatism was not only very common, but in nearly two-thirds of the cases it was—as it often is in glaucoma—against the rule.

The glasses prescribed were mostly sphero-cylinders, cylinders alone and lenses of unequal refractive value.

Opacities and myopia form a bad combination, and from an efficiency, or public health point of view, the results are deplorable. To illustrate the prevalence of this condition, it may be noted that my series of cases was collected in the course of my ordinary work in six months.

History: 62 per cent. of the opacities were due to some disease affecting the eyes when the patients were about, or under, 5 years of age.

Thirty-four per cent. to disease when between 5 and 10 years.

Four per cent. to disease when over 10 years.

The disease which caused the opacities was—with striking frequency—said to have followed measles.

Trantas[2] has described a fine superficial punctate form of keratitis, which he says affects 90 per cent. of cases of measles and is visible through the corneal microscope after solutions of fluorescein and eosine have been placed on the cornea. I have not been able to get this statement confirmed, but perhaps it merits notice.

An eye disease following measles, or occurring among children apart from measles, affecting, as a rule, both eyes and leaving opacities, is certain to have been in most cases phlyctenular ophthalmia. A few of my cases seem to have been due to ophthalmia neonatorum, and among those affected at an older age, are a number of cases due to interstitial keratitis and one suggestive of trachoma.

Phlyctenular ophthalmia is very common in this city, caused probably, at least in part, by home and social conditions, and a diet containing an undue proportion of sugar and starch.

In most of my cases there was a history of the ophthalmia having lasted for many months, and also of recurring attacks.

In three or four cases, the iris was adherent to the lens capsule, illustrating the fact that this disease is often associated with inflammation of the deeper structures.

In several, there was an isolated, small, deep opacity, probably the result of an ulcer, and with these localised lesions there was usually an absence of myopia; but where the opacities were patchy, punctate, or more or less diffused—conditions the result of general involvement of the cornea—there myopia was usually present, and where they were arranged in a band-like manner, there astigmatism was usually more marked. The degree of opacity varied from a well-marked leucoma to a faint nebula, visible only in the dark room with oblique illumination.

A few had myopia in both eyes, but opacities only on one, while there was a history of both eyes having been affected with inflammation; so it is possible keratitis may be followed by myopia and yet not by any obvious opacity.

The following is an illustration of phlyctenular ophthalmia.—M.O.K., aged 8, lives in a densely populated part of the city. When she was four years of age, she had her first attack. During the past four years she has been four times in the wards with recurrent attacks, and on two occasions the corneæ ulcerated. She has now opacities and moderate myopic astigmatism in both eyes.

The following is an illustration of interstitial keratitis, followed by myopia.—Mrs. W., aged 38, says she had good vision when she was a school-girl, could see writing on the blackboard, and could see to sew. At 16 years of age, one eye became affected and then the other, and for a year her eyes continued in this state. Some time later she was in the Royal Infirmary suffering from "specific ulcer" on the leg. Her vision now is reduced to counting fingers at three feet, she has 8 D. of myopia in both eyes, there is a solitary patch of choroiditis in the left fundus, and both corneæ present diffuse ground-glass-like opacities.

There were 21 *cases in which opacities appeared in one eye only, and of these* 21 *eyes* 13 *were myopic.*

Among the eyes free from opacities, 4 had myopia. Two cases had hypermetropia in both eyes, but the eyes with the opacities had less hypermetropia.

The following are the most pronounced cases in this section. I have taken the retinoscopic figures of each meridian, added them together and divided by 2, to obtain a single figure.

	Refraction of eyes *with opacities*.	Refraction of eyes *without opacities*.
Case No. 10	− 3 D.	+ 1 D.
,, ,, 18	− 2 ,,	− 0·5 ,,
,, ,, 24	− 4 ,,	Emmetropia.
,, ,, 26	− 6·5 ,,	Emm.
,, ,, 40	− 2·5 ,,	+ 1 D.
,, ,, 66	− 7 ,,	+ 1·5 ,,
,, ,, 68	− 4 ,,	Emm.
,, ,, 85	− 2 ,,	Emm.
,, ,, 91	− 3·5 ,,	+ 1 D.
,, ,, 92	− 3·5 ,,	− 1 ,,

In these ten nebulous eyes there is a total of 38 D. of myopia, and in the ten non-nebulous eyes there is only 1·5 D. of myopia. Swanzy[3] has written: "eyes with old standing nebulous conditions are often myopic and this is due to holding objects too close to the eyes." Does this theory meet those cases where one eye only is myopic? Where one eye has good vision there is no need to hold objects close to the eyes, and where there are opacities on both eyes, holding objects close is more likely to be a result than a cause.

By what alteration in the structure or mechanism of the eye is this result brought about?

(1) By stretching of the posterior segment of the globe, as in ordinary myopia; (2) by increased curvature of the cornea, or (3) by yielding at the sclero-corneal junction?

Walter Pyle,[4] an American writer, states that in nearly one-third of the cases in which corneal opacities are present, they produce myopia, and that this is not dependent on alteration of the corneal curve, but due to the mechanism that produces ordinary myopia. If the myopia is produced in this manner, *viz.*, by stretching of the posterior segment, then one might expect to find a myopic crescent or a posterior staphyloma. I have not examined all my cases with this object in view, but in about one-third of them I have sought for evidences of changes in the fundus. In three or four cases I have seen crescents, but they have been associated with fairly high myopia. The following case illustrates several points:—

D. M., aged 56, had "inflammation" in his right eye when 14 years of age, and, later, several recurrences of this trouble. His vision is: R.E. = 1/60, L.E. = 6/9. His left eye has a clear cornea, and in other ways is normal. His right eye has some fine opacities on the cornea, while the horizontal meridian has 2D. of myopia and the vertical 7D. The curvature of this cornea accounts for the astigmatism, but not for all the myopia; in fact, the horizontal meridian is flatter than the left horizontal meridian. In the fundus there is a white atrophic patch on the temporal side of the disc, of an area slightly greater than that of the disc. Its outer edge is irregular, but not pigmented.

I have not seen very much evidence of alteration in the fundus, but the average amount of myopia in the series is not such as would involve much change, and many of the patients were young. Donders wrote: "In a very young individual atrophy is, in moderate degrees of myopia, very rarely to be observed."

(2) The corneal curvature in non-nebulous eyes does not vary much. Tscherning has written: "If I except cases of astigmatism, different in both eyes, it is very rare to find a difference, ever so slightly noticeable, between the corneal refraction of the eyes of the same person even in cases of anisometropia." Take the following as an illustration.—C.M., aged 33, has

6 D of myopia in the right eye and 2 D. of myopia in the left, yet the corneal curvature, as estimated with the ophthalmometer, is the same in both eyes, and it is also the same as that obtained by observations in a series of emmetropic eyes. Donders thought corneal disease occasionally produced myopia by an alteration in the curvature. The anterior surface of the cornea is the principal refracting surface, and but slight changes in it are capable of producing marked results.

I have endeavoured to estimate the curvature of the cornea in my cases with the ophthalmometer and find that the varying amounts of astigmatism revealed by retinoscopy are usually accounted for by the corneal curvature, but beyond this there is myopia. Among the cases I have examined in this manner, there are five with myopia ranging from 4D. to 15D. and in all these the curvature is so increased as to account for all, or nearly all, the myopia. There is also a larger number in which the curvature is slightly increased, but not sufficient to account for all the myopia. There are six cases with myopia ranging from 2D. to 7D. in which there is no increase in the curvature. Three cases show flattening of the cornea, and the details of these cases are as follows:

L. R., aged 15, has hypermetropic astigmatism in the right eye and a clear cornea; in the left she has 7D. of myopia and corneal opacities. The ophthalmometer shows the left cornea to be flattened, or to form a segment of a larger circle than the right.

R. E. has his right eye emmetropic and free from opacity, while his left has an opacity and 2D. of myopia. The curvature of the latter is less than that of the former—that is, the radius of curvature is longer.

The next case is one of hypermetropia, but it is included in the series:

T. T., aged 30, has in his right eye 1 D. of hypermetropic astigmatism and a clear cornea, while his left eye has 7 D. of hypermetropia and corneal opacities. The cornea of the left is markedly flattened and the loss of curvature is equivalent to the amount of hypermetropia. This man was 27 years of age when he had the corneal "inflammation."

These corneal curvature results are discordant.

In THE OPHTHALMOSCOPE[5] several cases are recorded of "furrow keratitis," or "marginal atrophy of the cornea," associated with yielding to the intra-ocular pressure. Coats thinks that in these cases the thinned part of the periphery stretches and allows that meridian to fall forward.

(3) Then, as to the third possible cause—yielding at the sclero-corneal junction—Parsons[6] writes: "After parenchymatous keratitis, etc., the whole cornea protrudes." The sclerotic around the edge of the cornea is considered to be weak, and if yielding occurs here, it does not necessarily involve increase of the corneal curvature.

I have several cases that seem to belong to this category. The following is an instance:

N. F., aged 14, was affected some years ago with what was called "strumous keratitis." She has decided opacities on both corneæ and 5 D. of myopia in both eyes. The base of each cornea is increased, the diameter being 2 mm. longer than the average, and the anterior chambers are deep. An optical iridectomy has been done in one eye, but the vision remains equally defective in both, *viz.*, 6/60 and the corneal curvature does not account for the myopia.

I am indebted to Dr. Maitland Ramsay for the following case:

P. A., aged 18, suffered from phlyctenular ophthalmia ten years ago. He came to the Institution last year—that is after an interval of nine years—when it was observed that the tension in both eyes was very high (+ +). He was admitted to the wards, treated with eserine, and later had sclerectomy done in both eyes. The tension is now normal. Dr. Ramsay thinks the high tension was due to stretching of the coats of the anterior part of the eyeball with advancement of the periphery of the iris and so blocking of the filtration angle. His vision is only 1 60 in each eye, and he has 8 D. of myopia in both eyes. The curvature of the cornea is not increased, but the diameter of both is increased 2½ mm. beyond the average, and the anterior chambers are not deep. The iris is adherent to the lens capsule in both eyes and both corneæ present opacities.

Mackenzie[7] wrote " many become amaurotic, with hardness of the eye, and glaucoma, who in youth suffered from phlyctenular ophthalmia."

Many of my cases had deep anterior chambers, but whether this was due to advancement of the cornea or otherwise, I am unable to say.

It is more difficult to demonstrate advancement than broadening of the base of the cornea, but some of these eyes when looked at from the side present a suggestive aspect. The angle or furrow over the limbus, formed by the difference in the curvatures of the sclerotic and the cornea, is less obvious than it usually is, and the sclerotic instead of curving gracefully up to the cornea seems flattened, giving to the eyeball the aspect of tapering forwards like the narrow end of a pear.

I gather from my cases that keratitis is more likely to be followed by myopia when it affects young people than when it affects adults, for several of the cases that did not present myopia belong to the latter class.

I understand it has not been established that high ocular tension exists in ordinary myopia, yet there is defective resistance to the intra-ocular pressure. Inflammation of the tunics of the anterior part of the eye probably weakens their resisting capacity.

In those cases where there is flattening of the cornea, or where the curvature only accounts for part of the myopia, there must have been yielding at, or near, the sclero-corneal junction, or at the fundus.

There is evidence, then, of alteration of the curvature of the cornea, evidence of yielding at the sclero-corneal junction, and also some evidence of changes at the fundus.

Pericorneal alteration involves corneal alteration ; for example, broadening of the base of the cornea means lowering of the dome, or flattening of the cornea and uneven basal disturbance means uneven alteration of the cornea. The cornea alone may be affected, but probably cornea and pericorneal area are both usually affected.

It seems possible that there might be flattening, or loss of curvature, at the periphery of the cornea from contraction and without any yielding in the centre ; but apart from this, in all cases where myopia is produced, the condition resolves itself into an inequality between the intra-ocular pressure and the resistance offered thereto. I have estimated the tension in a series of acute and subacute keratitis and find that it is usually low, and so far I have not been able to discover myopic conditions in actively affected eyes, and thus I suspect the alteration which produces myopia takes place after this stage has subsided.

If, then, it is admitted that phlyctenular and interstitial keratitis are causes of myopia, this should be kept in view and should influence our treatment. It goes without saying that the treatment should be as efficient as circumstances permit. These cases should be kept under observation after the acute stage is over, school work relaxed, and an effort made to keep the intra-ocular pressure low. The probability of recurrence and the danger from neglect of treatment should be impressed upon parents.

It is said that when an eye is put under the influence of atropine the cornea becomes slightly flatter. I have estimated the curvature in a series of cases when they were under atropine, and again for comparison two weeks after it has been discontinued and find that this is true of many cases. Atropine lessens most of the secretions, and it has been said to lessen the aqueous ; but this point calls for further investigation. For the safety of the iris, etc., atropine is indispensable, and perhaps especially so in those cases that seem to resist its influence and where the pupil remains imperfectly dilated. The tension, however, should not be ignored when atropine is used continuously for weeks, for these eyes may be unable to resist the normal pressure.

Mackenzie[8] treated these diseases with tartar emetic to the extent of causing sickness and to this day his treatment survives with us. It lowers blood-pressure and so may be useful in this direction. Hot baths lower blood-pressure and may also be useful, perhaps just as they are in dilated heart.

I need not describe the lines of ordinary treatment, but will content myself by referring only to one other point. Whether phlyctenular ophthalmia "is due remotely to the tuberculous diathesis and immediately to an eruption of eczema or impetigo upon the surface of the eyeball"[9] or not, there is probably some auto-intoxication from gastro-intestinal disorder. Mackenzie[10] wrote : "It is necessary strictly to forbid pastry, comfits, jellies and the like." This treatment also survives and much importance is attached to it.

The treatment of these cases in our crowded outdoor department can hardly be other than unsatisfactory, while of the available indoor accommodation, they already have a large share.

REFERENCES.

1. **Parsons.**—"Pathology of the Eye," Vol. III, p. 921, 1908.
2. **Trantas.**—THE OPHTHALMOSCOPE, January. 1908, p. 50.
3. **Swanzy.**—"Diseases of the Eye," p. 165. 1912.
4. **Pyle**—THE OPHTHALMOSCOPE, October, 1908, p. 835.
5. **Coats and others.**—THE OPHTHALMOSCOPE, June, 1911, p. 446.
6. **Parsons.**—"Pathology of the Eye," Vol. I, p. 174.
7. **Mackenzie.**—"On the Diseases of the Eye," p. 420, 1840.
8. *Ibid.*, p. 421.
9. **Stephenson.**—THE OPHTHALMOSCOPE, June, 1910, p. 462.
10. **Mackenzie.**—p. 426.

A CASE OF RETINAL EMBOLISM.

BY

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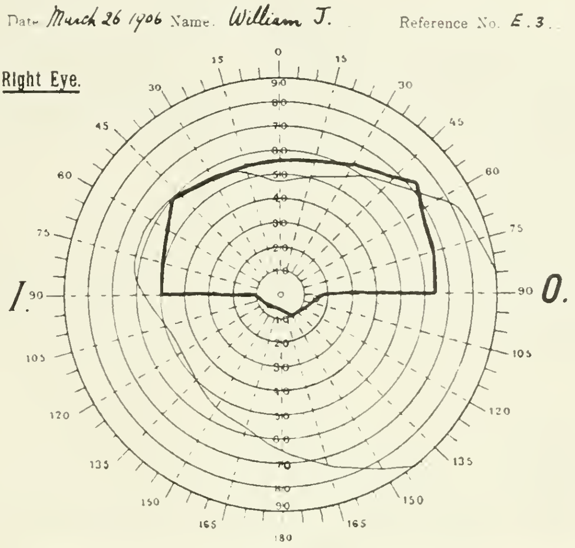
UNDOUBTED cases of retinal embolism are not common, the so-called "embolic" cases being usually due to thrombosis. The case which I now record was due to embolism, for the embolus could be seen with the ophthalmoscope. The patient made a very good recovery, regaining a large part of the visual field and normal visual acuity. The case is, perhaps, of sufficient interest to record.

History.—The patient William J., aged 31 years, a tube drawer by occupation, was going to work as usual on March 21st, 1906, when he noticed something wrong with his right eye. He put his hand over the left eye and found that he could see nothing with his right. It was quite dark. He immediately rubbed his right eye vigorously, and in about ten minutes found that his sight had returned in that eye, but that he could see nothing below the horizontal line of vision. He tolerated this for five days, and then presented himself for advice at the Birmingham and Midland Eye Hospital.

Condition on first visit.—Right vision=6/8 most and J. 1½. In order to get this vision he inclined his head downwards and at the same time looked upwards a little.



Date March 26 1906 Name. William J. Reference No. E. 3.

FIG. 1.

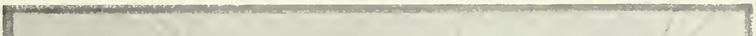


FIG. 2.

The right visual field (fig. 1) showed absence of the lower half. There was a unilateral horizontal hemianopsia which did not include the fixation point.

The right fundus condition was as follows.—There was œdema of the upper half of the retina, the lower margin just falling short of the macula and presenting an edge of wavy contour (fig. 2). The superior retinal vessels were empty and devoid of pulsation on pressure of the eyeball, the inferior vessels being quite normal and pulsating regularly. A round whitish body could be seen in the superior retinal vessel sitting astride the bifurcation into superior temporal and nasal vessels. The lower artery was not obstructed, but the embolus seemed to project slightly into its lumen. When digital pressure was applied to the eyeball to produce pulsation in the retinal vessels, this whitish foreign body could be seen to throb, as it were, on the disc.

The vision of the left eye was 6/8 part. The rest of the eye was normal.

The man was examined by Dr. James Russell at the General Hospital, Birmingham, who found that the patient had definite old endocarditis of the mitral and aortic valves.

Progress.—This was uneventful. Three days later, his vision in the right eye was 6/6 most and remained so thereafter.

The upper half of the optic disc became pale and the superior vessels were constricted for some time, but on November 22nd, 1906, they had become larger and were patent, for pulsation could be observed in them on digital pressure on the eyeball. The white mass could still be seen in the lumen of the superior vessel as it lay on the disc. The visual acuity remained 6/6 and the field of vision had increased in size (fig. 3).

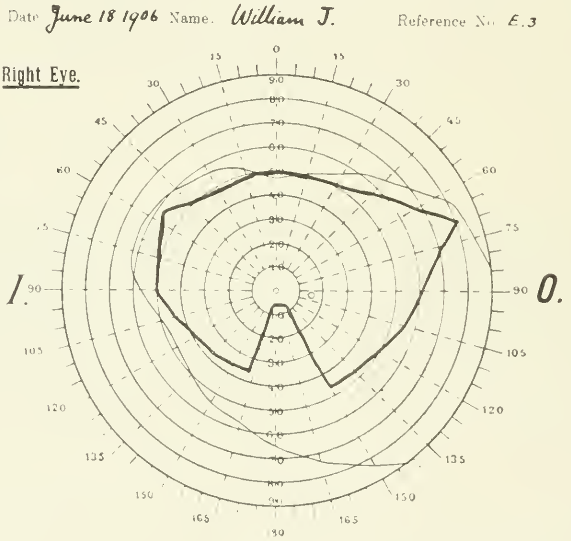


FIG. 3.

The patient was last seen on January 28, 1907, when his condition was found unaltered, but the field was not quite as full.

Comments.

This was a case of undoubted embolism, for the embolus could be seen in the vessel lumen. Its origin was probably from some recent vegetations on the cardiac valves, since he had definite valvular disease. The embolus obviously blocked the central retinal artery at first but was dislodged by vigorous rubbing of the eye, thus once more demonstrating the value of deep massage of the eyeball in recent embolism. The dislodged embolus lodged in the main trunk of the superior retinal vessel and there remained. The blood current in the distal branches of the superior vessel clearly became re-established at a later date, and as the embolus could still be seen, it must either have become partly absorbed or canalised, as a thrombus sometimes is, in order to allow a stream of blood to pass.

CLINICAL MEMORANDUM.

ASSOCIATED MOVEMENTS OF UPPER EYELID AND JAW.

BY
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SOME few years ago I reported in the columns of THE OPHTHALMOSCOPE (Vol. VI, 1908, p. 22) an example of synkinesis between the jaw and an upper eyelid not affected with ptosis. The peculiarity of the case was that the other eye was affected with slight ptosis as a congenital defect.

Since that note was published I have come across a second case, the facts of which are as follows:—

In July, 1909, I was consulted by a lady, aged 41 years, for symptoms referable to eye-strain, in consequence of hyperopic astigmia. From this lady I gathered that there was some peculiarity about her left upper eyelid, which had certainly been present as long as she could recollect. As a girl of six or seven years, she recalled that her father used to draw attention to her at meals, remarking that "Gertrude ogled her food." On examination, it was found that with movements of the lower jaw, the left upper eyelid executed slight up and down excursions. The movements were more pronounced when lateral movements of the jaw were made. There was no ptosis.

The patient was seen in July, 1911, and the conditions described above were found to be unchanged.

NOTES FROM SOME CONTINENTAL EYE CLINIQUES.

(*Fifth Article*)

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V.—VIENNA.

PART I.—THE FUCHS' KLINIK. (II. AUGENKLINIK.)

TO ONE who has quite recently visited a number of the newer Continental hospitals, some of them the newest and most up-to-date, others of comparative modernity, the *Allgemeines Krankenhaus* at Vienna comes as somewhat of a shock. To call this building un-modern is to indulge in a euphemism, for although ancient and out of date it entirely lacks the dignity which is so often possessed by such buildings. It is difficult to imagine the mental attitude of a governing body which allows the walls of a hospital to be decorated with irrelevant poster advertisements. That excellent work is done within these outwardly unprepossessing walls requires no emphasis from me.

In some parts the buildings have been remodelled inside, and the best under the circumstances has been done. Several kliniks have been rebuilt apart from the *Allgemeines Krankenhaus*. The fact remains nevertheless that some men of world-wide reputation carry on their daily work under what, to the outsider, must necessarily appear to be unfavourable surroundings. In a time yet to come all this will be changed. The changes have already begun, but it is a bye-word in Vienna that such changes occupy an amount of time that might almost be described as geological.

The Fuchs' Augenklinik is among those not yet reconstructed or rebuilt. It demands no description. The interest centres in Professor Fuchs and his work. The importance of the Vienna kliniks from the standpoint of systematic teaching of postgraduates is so well known that it is not necessary to enlarge on that aspect. I shall limit what I have to say wholly to clinical points which have come under my personal observation or about which I have made special enquiry.

Operative Technique in Cataract and Glaucoma.

It is probably true that a great many readers of THE OPHTHALMOSCOPE have been "brought up" on Fuchs. They may have never seen him, may have never had the opportunity of looking over his shoulder at operations, or of listening to his lectures and to his exposition of cases, and yet may have got into the habit of consulting the familiar volume when they are in need of a sound common sense view of a difficult class of case. I feel sure that the details of his operative *technique*, although limited in the matter of individual operations to cataract and glaucoma, will prove interesting.

Prophylaxis.—Few things have interested me so much in the course of my travels as this question of prophylaxis. Is it or is it not important to have a full knowledge of the bacteriology of the conjunctiva in every case where the eyeball is to be opened?

For the following statement of the practice in this klinik I am indebted to Dr. Meller, at the present time first assistant to Professor Fuchs:—(1) If there is no conjunctivitis, that is if the conjunctiva and lacrymal sac seem perfectly normal, operation is undertaken. As a matter of scientific interest an assistant examines the bacteriological condition in every case, but where conjunctiva and lacrymal passages appear normal the result is not waited for. (2) If conjunctivitis is present, the organisms are investigated and treatment undertaken before the operation is performed. (3) If there is an affection of the tear passages the sac is removed and the puncta cauterized. The main operation is not performed at once. The organisms are given time to disappear from the conjunctiva. (4) A test bandage is strictly forbidden.

Preparation of the patient.—The conjunctival anæsthetic has been employed beforehand. The preparation of the field of operation is done when the patient is on the table, and usually by the operator himself. The eyelids and surrounding skin are first cleansed with benzine on a cotton swab. They are then washed thoroughly with a fluid neutral soap, which does not irritate the conjunctiva should it chance to get there. (*Note.*—Benzine should be kept in special metal cans with screw down lid and spout.)

On the wall of the operating room, close to the table, and about 7 feet from the floor, are three tanks containing different solutions. From each tank there is a rubber tube ending in a flat vulcanite nozzle provided with a rocking finger tap. When not in use, these nozzles lie in jars of lotion situated underneath the large supply jars.

When the lids and neighbourhood have been cleansed as above described, the operator flushes out the conjunctiva by placing the flat nozzle of the irrigator under the upper lid and opening the tap with his finger point. The fluid, allowing for the height of the table, emerges under a head of several feet. Normal saline is used as rule with the irrigator, and also for swabbing during the operation, but if the conjunctiva is open to suspicion, weak sublimate is employed for irrigation.

The eye not undergoing operation is usually temporarily tied up with a cotton pad and a plaster strip. The "veil" (*Schleier*) with hole for the eye undergoing operation, is placed over the face and head, a sterile towel is adjusted over the body, and the patient is ready.

I should like to draw attention to the device employed for the storage of cocain and other drops which may be required in the course of, or after the operation. These are contained in bottles of the grooved stopper type and having ground glass labels. Fluid can pass into or out of the bottle only when the stopper is turned in a particular direction. When the stopper is turned back to the closed position, the bottle is absolutely watertight. All these small bottles, cocain, atropine, etc., lie sealed from contamination in a large covered jar of solution of thymol 1 to 10,000. When a drop bottle is wanted it is fished out of the thymol solution with sterile forceps, wiped free of thymol with a sterile swab, used as required, and returned to the jar of thymol solution. If by chance the operator omits to turn the stopper back to the closed position the thymol solution will, of course, enter the drop bottle and spoil the contents.

The Position of the Operator and other matters.—In this klinik the operator sits at the side of the operating table, which latter stands parallel to the window. The operator and patient face each other in such a way that they are right hand to right hand. The right eye is operated on with the left hand, the left eye with the right hand. The operator's stool is really a kind of saddle—something like a large bicycle saddle—provided with a high iron back. Perhaps this iron back finds its main use in preventing the observer stationed immediately behind the operator from interfering with the latter's movements. There is always a crowd round the Professor.

Immediately to the operator's left, quite close to him, is a stand which carries a large lotion basin and an instrument tray containing sterile water. These two are separated the one from the other by a vertical metal shield to prevent contamination of the latter by splashes from the former. The operator once seated in the "saddle" often does not leave it until a number of operations have been performed. Between operations he rinses his hands in the lotion basin, which I think contains a certain amount of soap in solution. Beyond this stand with the lotion basin and instrument tray is the sterilizer for instruments. Instruments, as called for, are picked out of the sterilizer by an attendant with a pair of long forceps and placed in the instrument tray at the surgeon's left-hand. I have no note as to whether delicate cutting instruments are boiled or not. When an instrument is to be re-boiled, it is placed by the operator himself in the sterilizer, which is just within his reach. An instrument required by the assistant is usually passed to him by the operator. Operator and assistants all wear ordinary mouth and nose masks, with hooks passing behind the ears. It is not thought necessary in this klinik to make much special preparation as regards the clothing of operator, assistants or attendants. Sterile sleeves are worn by operator and assistants, over the usual hospital overall. That, so far as I know, is all the special preparation that takes place.

The key-note of these arrangements seems to me to be simplicity. Nearly everything is within the operator's reach. He does the handling of the eye and of the instruments as much as possible himself, and depends as little as possible for asepsis on the doings of others. In some other kliniks, already described or about to be described, there is much more elaboration of aseptic *technique*. Whether the results are or are not better is a point which, for want of knowledge, I am unable to decide.

The position of the operator as described above is not peculiar to this klinik. Although, perhaps, it is more rigidly adhered to by Fuchs than by some others, this, or alternately the similar position on the other side of the patient, is more usual in the kliniks I have visited than our British one at the patient's head. It is, doubtless, the case that one can operate best in the position which is individually most comfortable, but there is an objection to the face to face position of patient and operator which has nothing to do with the actual operative *technique*. The objection to which I refer is that it is easy for the operator to get in his own light. The surgeon begins his operation in daylight, but at a critical point some portion of his person intercepts the light from the window and artificial light is called for. In the absence of special lighting arrangements, this usually means a hand lamp. Now, there are objections to the hand lamp unless its use has been anticipated and arranged for. (1) The lamp is "not working," a common fault, especially when the current is derived from some form of apparatus to reduce voltage. (2) The assistant who holds it may be unskilled in directing the light correctly. (3) The lamp may be surgically dirty. This objection has not much weight when the assistant is detailed for this purpose only. (4) The lamp is almost sure to block the view of one or more of the observers at the moment of greatest interest. I have been very often baulked in a laudable ambition to see all the steps of an operation by the introduction of the hand lamp.

This whole question of the illumination of the field of operation is a difficult one, and by the majority of operators hardly seems to have received as much attention as it deserves. Aside altogether from the question of the position of the surgeon and patient mentioned above, would it not be a good thing if we could standardise our methods of artificial illumination? Is any one detail more important than this? Might the question of illumination not be a worthy subject for discussion at one of the Congresses? At the present time some operators use a forehead lamp, some a hand lamp, others again employ sometimes the one and sometimes the other. Some prefer to focus the light from a fixed overhead lamp by means of a hand lens. What, then, is the *best* method of artificial illumination? What is the most certain, the most constant, and the least inconvenient way of illuminating the field of operation at a second's notice?

I have indulged in the luxury of a grumble on this subject, but since what has been said is quite impersonal, referring as it does to a number of kliniks at home and abroad, I trust I have offended nobody.

In the Fuchs klinik, from which I have wandered somewhat in making the foregoing remarks, a bull's eye type of hand lamp with a wooden handle, hangs on the wall. When required it is held by the operating room attendant. The flexibles of this lamp are run through rubber gas tubing, a well-known device to prevent kinking of and damage to the wires.

The Cataract operation. In senile cataract the operation of choice is that with the small basal iridectomy, but if there is any doubt about the conjunctiva the complete iridectomy is performed so as to avoid risk of prolapse. The Smith operation has been tried but is not in favour. It is considered too dangerous.

The eye having been been prepared and cocainized—my notes say nothing as to the condition of pupil desired—the lids are held apart by an assistant who stands at the patient's left side, opposite the operator. Only occasionally is a Desmarres elevator employed.

The eyeball is fixed in the usual way. A large section is made with as few sawing movements as possible and a considerable conjunctival flap is cut out

A piece of capsule is removed. In a case where the capsulectomy forceps were defective Meller mapped out an area of capsule with the cystotome and then removed the piece with ordinary forceps.

The delivery of the lens is usually done without instruments. The operator exerts the necessary pressure on the lower part of the cornea by means of his forefinger on the lower lid. The lens presents in the wound while the upper lid is held off the eyeball by the assistant's thumb. In his free hand the assistant has a curette held ready under the upper lid. In this he receives the lens, and, possibly, if necessary assists gently in the delivery. The lens having being delivered and visible cortical fragments coaxed out, the iris is carefully stroked into position and a basal iridectomy performed with fine forceps and spring scissors. A little lotion is used to clear out any blood clot or cortex from the conjunctiva. The assistant still holding the upper lid, strokes the conjunctival flap into position with the curette and immediately thereafter receives the weight of the upper lid on the curette and guides the lid over the conjunctival flap.

It seemed to me that the outstanding advantage of the relative positions of patient, surgeon, and assistants, above described, is the freedom with which the assistant can manage the lid without interfering with the manipulations of the surgeon.

Although the detailing of the precise steps has occupied a little time the actual operation is quick and neat.

In a case in which a serious vitreous prolapse occurred I was much struck by the ease with which Fuchs impaled the lens on the double lens-hook and removed it. This instrument, which is introduced closed like an iris forceps, is allowed to open when behind the lens. The lens is at once impaled on the fine sharp prongs and can be removed with much less disturbance than is caused by a spoon.

The Lagrange operation.— At the present time, the Lagrange seems to be Fuchs' operation of choice in congestive glaucoma. In Vienna, glaucoma is a very common disease, and in the short time I remained there I saw a number of Lagrange operations for relief of the congestive form. It is remarkable that in none of these did the patients seem to have any severe pain. All were operated under local anæsthesia. I am under the impression that the good behaviour of patients under local anæsthesia is largely due to the use of morphine or its allies. Unfortunately, this is a point about which I did not specifically enquire.

The preliminaries are the same as for cataract extraction. Usually, no speculum is employed, the fingers of the assistant taking the place of it. Sometimes the Desmarres elevator is more convenient. The eyeball is fixed with double-pronged forceps, placed at the opposite end of the meridian corresponding to the point of entrance of the knife. The scleral and conjunctival flaps are made in the usual way with a Graefe knife. The conjunctival flap having been simply turned down over the cornea, the anterior scleral lip is grasped in forceps and excised with one snip of a pair of strong de Wecker scissors. The iridectomy is then performed, the iris very carefully stroked into position, the conjunctival flap replaced and the upper lid lifted over it in the manner referred to under cataract. The unoperated eye is left uncovered and is treated with eserine.

In the hands of Fuchs the Lagrange operation occupies practically no longer time than a glaucoma iridectomy. It has been reduced to its simplest terms, although I fancy the *technique* is not exactly that of Lagrange himself.

I am under the impression that it is still considered undecided whether this operation has advantages over ordinary iridectomy in congestive glaucoma. I had the opportunity of seeing an instructive case in which iridectomy had been performed on one eye and the Lagrange operation on the other. Both eyes had done badly, and had practically behaved alike.

Methods of tying up the eye.—In most of the kliniks which I visited the ordinary bandage is never used, except when it is desired to employ pressure. The sticking plaster method in one form or another, or the wire mask, have largely taken the place of the roller bandage, not only in the out-patient department, but also after major operations. The plaster method is undoubtedly simpler and quicker for the surgeon and lighter and cooler for the patient, although, whether the latter, when hairy, enjoys the removal of the plaster every day for the inspection of the eye, is doubtful. Probably, when the removal is quickly done and the face not very hairy, the pain is negligible. But I have seen it otherwise.

In the Fuchs Klinik, it is recognised that the sticking plaster method is the ideal method, and also that for men it is inconvenient. Consequently, two different plans are adopted. In the male wards, the cotton pad on the patient's eye, after a major operation, is covered with a Fuchs' wire mask. This mask is for the operated eye only—in other kliniks I have seen it double sided—and is fixed with tapes round the head. In the female wards, after a cataract or other such operation, a small cotton pad is placed on the eye and covered with a perforated metal shield. The shield is held in position by two or three vertically placed strips of plaster from cheek to brow.

Doubtless there are various makes of plaster. Some kinds seem to stick and detach more easily than others. Some surgeons employ the plaster broad, others narrow. By practically all it is kept ready cut in suitable lengths, and either stuck on to a piece of the original face cloth of the plaster in parallel strips, or on to a smooth board.

After-treatment.—I wish to mention only one point in the after-treatment of these operations—namely, that in most cases the patient is allowed to sit up in a chair after twenty-four hours. It is considered that the restlessness of the patient, lying on his back with eyes bandaged—a restlessness which commonly is not seen or appreciated by the operator himself – does away with any advantage obtained or supposed to be obtained through the recumbent posture.

An Advancement Operation.

A strabismus operation which I saw performed by Fuchs, seemed illustrative of his tendency towards simplicity, and to be worth describing on account of that characteristic. The case was one of convergent strabismus. An advancement of the externus, without tenotomy of the antagonist, was the operation selected.

The incision in the conjunctiva was quite small. When the muscle had been well exposed and isolated in this small wound it was gripped in a pair of straight catch-forceps (hardly so convenient, one would think, as those of Prince), and the insertion of its tendon cut away. Very little dissection was made; there was a minimal disturbance of the parts. The muscle was then held up in the forceps and two stitches were inserted through everything from within outwards, and very far back. The free ends of the threads were passed into the eyes of self-threading needles, and with these the usual deep anterior grip was taken in the episcleral tissue. The threads were then tied without excising any portion of the tendon.

The operation was neat, simple and rapid of execution. The immediate effect seemed to me somewhat insufficient in this particular case. I have recorded it as an example of extreme simplicity, which may be contrasted with other more complicated methods of advancement.

Incidentally, it may be mentioned that the use of "spring-eyed" needles seems to be commoner on the Continent than in this country.

The Schiötz Tonometer.

In the course of my visits to his Klinik I heard Professor Fuchs say a good deal about glaucoma. I gathered that at the present time, and especially since the introduction of the Schiötz tonometer, he is particularly interested in this disease and its treatment. I do not think that the tonometer has in any way revolutionized the management of glaucoma in Fuchs' hands, but it seems to have introduced a number of new problems. There has lately been a series of very perplexing tonometric results. All cases are investigated tonometrically, but, as Fuchs says, you can usually diagnose congestive glaucoma with your finger and simple glaucoma with your ophthalmoscope, and the subjective evidence—visual reduction, fields of vision. He does not believe that congestive and simple glaucoma are distinct diseases.

In congestive glaucoma operation should be insisted upon in the prodromal stage—when the case comes under observation at that stage—and on no account ought the practitioner to allow the patient to use myotics at home. Myotics merely give a false sense of security, postpone the operation from a comparatively favourable to an unfavourable period, and give time for reduction of visual acuity to take place.

The treatment of Trachoma.

By the courtesy of Dr. Rössler who is in charge of the trachoma wards and out-patients in the Fuchs Klinik, I was able to see a large number of cases undergoing treatment, and to take precise notes of the methods employed, operative as well as therapeutic. Were I to incorporate these notes in the present article too much space might be occupied. I hope at a later date to review the treatment of trachoma, and will postpone detailed observations until then. There is, however, one opinion in this klinik which stands out in front of everything, and that is that copper sulphate and silver nitrate have no real rivals as routine applications in trachoma. Various forms of treatment—and their name is legion—have been tried in the past. The latest was carbon dioxide snow. It was found when carbon dioxide snow and copper sulphate were employed one against the other in the right and left eyes of the same patient, that there was distinctly more scarring with the snow than with the copper. As time went on this became such a convincing fact that the snow was given up. I had the opportunity of seeing for myself a number of cases which had been so treated up to within the last few months, and there seemed no doubt of the facts.

In what I have just said about the pre-eminence of copper sulphate I do not mean to include operative treatment. "Expression" is largely employed in this klinik, and is done in a most careful and systematic manner, which gives the patient no pain—at any rate during the operation. For trichiasis and for entropion electrolysis and the Hotz operation are considered to be the best and simplest measures.

Serum and Vaccine Therapy. Tuberculin.

Speaking generally, and from a practical standpoint, serum and vaccine therapy are held to be of no use. It is true that changes in a corneal ulcer may result from such treatment, but time is wasted in relying on it. Eyes have been lost through the withholding of the cautery, so that while we may, if we choose, use sera and vaccines in serpent ulcer, we must use the cautery first and foremost.

Tuberculin is much used. All the same it still remains with Fuchs a moot point whether it is of much real value. It is very difficult to say how much of any given good result is due to tuberculin. Again, it must not be forgotten that a patient may react to tuberculin, and yet the eye condition from which he suffers need not necessarily be tuberculous.

In essentials the method employed is that of v. Hippel. If there be no reaction in two days the initial dose is doubled. If there is a reaction one waits two days after the reaction is over and then repeats the initial dose, and so on.

If the patient is not tending to react he is treated outdoor, coming up every two days or so for injection. If he is reacting easily he is treated indoor.

CURRENT LITERATURE.

NOTE.—Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—METHODS OF EXAMINATION.

(1) **Wolffberg.—Trial lorgnette. (Probier-Lorgnette.)** *Wochenschrift f. Therapie u. Hygiene des Auges*, 24 März, 1910.

(2) **Rhoads.—A one degree astigmatism scale.** *Ophthalmic Record*, May, 1910.

(3) **Gullstrand, A.—New methods of ophthalmoscopy without reflex. (Neue Methoden der reflexlosen Ophthalmoskopie.)** *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1910.

(4) **Thorner, W.—A hand ophthalmoscope without a reflex. (Ein reflexloser Hand Augenspigel.)** *Zeitschrift für Augenheilkunde*, Juli, 1910.

(5) **Haab, O.—On ophthalmoscopic examination by the direct method with indirect illumination. (Ueber die ophthalmoscopischen Untersuchung im aufrechten Bilde mit indirekter Beleuchtung.)** *Beitrag zur Augenheilkunde*, September, 1910.

(6) **Howe, Lucien.—On the different prism tests, with presentation of a series of prisms arranged on a circular disc.** *Ophthalmology*, October, 1910, and *Trans. American Ophthalmological Society*, Vol. XII, Part ii, p. 669, 1910.

(7) **Coronat.—A simple device for the determination of errors of refraction.** *La Clinique Ophtalmologique*, 10 novembre, 1910.

(8) **Rhoads, J. N.—An iris diaphragm retinoscope with white, amethyst, smoked or yellow mirror.** *American Journal of Ophthalmology*, January, 1911.

(9) **Armaignac, H.—A double loupe for simultaneous magnification and lateral illumination.** *La Clinique Ophtalmologique*, 10 février, 1911.

(10) **Servel.—A dry battery photophore, and illumination of the anterior segment of the eye.** *La Clinique Ophtalmologique*, 10 avril, 1911.

(11) **Golowin, S. S.**—An ophthalmoscope without a central aperture. (Ein Ophthalmoscop ohne Zentralöffnung.) *Klin. Monatsbl. f. Augenheilkunde*, September, 1911.

(1) **Wolffberg**, of Breslau, recommends instead of the usual trial frames, a lorgnette having a movable bridge and adjustable pupillary distance with positions for two lenses, one of which is rotatory before each eye. The handle is set at a slight angle, so that the frame and lenses are placed for reading when the stem is vertical. For distance, a slight inclination forward of the handle puts the lenses vertical. The author considers the trouble of placing hooks over the ears too great, and has therefore given up the regular trial frames. [The lorgnette can be obtained from Gebrüder Cuno, Breslau, Albrechtstrasse 1.] W. B. INGLIS POLLOCK.

(2) **Rhoads,** of Philadelphia, describes his trial frame scale, which he divided in single degrees instead of the usual five degree spaces. The scale has been extended into a complete circle, there is also a travelling index, notched cylinder rings locked with an axis pin for getting the "knife edge" axis of astigmatism. These technical details do not lend themselves to abstract. J. JAMESON EVANS.

(3) **Gullstrand**, of Upsala, demonstrated to the Heidelberg Congress various methods of ophthalmoscopy without a reflex, some of which gave a stereoscopic effect. In one method a reflexless view of the macula could be obtained stereoscopically without dilating the pupil.

T. HARRISON BUTLER.

(4) **Thorner** (Berlin), has already invented an ophthalmoscope on a stand which has no light reflex and can be used for purposes of demonstration. The magnification is great, and so the instrument takes the place of a direct vision, upright image ophthalmoscope. This instrument is, however, quite unsuited for general use, and so Thorner devoted himself to inventing one which could be used as an ordinary ophthalmoscope. The paper discusses the various conditions under which a reflex appears, and different methods by which it may be excluded. This part would be unintelligible without the diagrams which accompany the description. The method of double reflexion was adopted, and the result is a small box-shaped instrument, illuminated by a self-contained electric lamp, which gives a clear image of the fundus without any disturbing light reflex. We should much like to try the ophthalmoscope, which is manufactured by Franz Schmidt and Haenach in Berlin. The exact address of the firm is not given, nor is the price of the instrument stated. T. HARRISON BUTLER.

(5) **Haab**, of Zurich, draws attention to the fact that small spots in the macular region, which are invisible or barely visible by ordinary ophthalmoscopy, are easily seen when the image of the flame (he uses an Argand burner) is thrown directly upon the spot. Other small foci alter their colour when looked at in this way. Cases are instanced in which the method has proved valuable. We have not ourselves grasped exactly how the examination is to be made; the text is not explicit. T. HARRISON BUTLER.

(6) In estimating the dynamic condition of the ocular muscles, results differ according to the method employed. For example, if we try to measure the power of the adductors by means of prisms base out, beginning with a prism high enough to produce diplopia and gradually reducing it until we find the weakest prism which will produce double vision, we arrive at what is called the "minimum power of adduction," and this has a constant value with repeated testing. But if, on the other hand, we begin with a prism which is easily overcome, and gradually increase it until diplopia is produced,

we get a much higher value, and one which varies even in the same patient at different times. This is the "maximum power of adduction." The former should be the standard test for the dynamic condition of the eyes.

Howe's device is simply a series of about forty small prisms, arranged round the periphery of a circular disc, five centimetres in diameter, which revolves on a handle, like that of an ophthalmoscope. A pendulum is attached to indicate when the position of the prisms is truly horizontal.

A. J. BALLANTYNE.

(7) **Coronat,** of Lyons, has worked up Scheiner's experiment into an apparatus for the quantitative determination of errors of refraction. The article in which this is described is accompanied by mathematical calculations, and those interested are recommended to consult the original.

ERNEST THOMSON.

(8) To the title given to his paper is added as a sub-title by **Rhoads,** of Philadelphia, "especially adapted for presbyopia with or without cocain. Attention is called to the fact that the pupil can be dilated by will."

Rhoads states that if, in testing presbyopes without mydriasis, the light from a coloured mirror which has been stopped down (in this instrument by means of an iris diaphragm), be first thrown upon the eye and then the patient be told to open his eye widely the pupil instantly dilates, and in most cases remains dilated long enough for a single lens to be selected. The same thing is done for the next lens, and so on.

Rhoads has found this retinoscope with coloured mirror and iris diaphragm in front of it to be a good instrument for general use, as well as specially for the purpose of measuring the refraction of presbyopes.

ERNEST THOMSON.

(9) **Armaignac,** of Bordeaux, has ingeniously arranged two lenses by uniting them by means of a ball and socket joint, so that with one hand the surgeon is able to avail himself of magnification and focal illumination, while the other hand is free for operative manipulations. The instrument is sold "at a very moderate price," and the lenses can be used in the ordinary way for ophthalmoscopic examination. ERNEST THOMSON.

(10) **Servel,** of Avignon, has arranged an ordinary electric torch of commerce with a sliding tube to carry a convex lens for varying the extent and the intensity of the illuminated field. Provided, in addition, with a magnifier (the handle of which is held in the mouth), the surgeon has both hands free, since the torch can be held by an untrained person. The simple apparatus is intended for use where the illumination may prove unsatisfactory, as, for instance, in a patient's house. ERNEST THOMSON.

(11) This ophthalmoscope, designed by **Golowin,** of Odessa, is apparently intended for use in the indirect method. The mirror, instead of being perforated with a central hole, has a semi-circular portion cut out of one edge. In using the mirror this edge is turned towards the nose, and the observer looks *past*, instead of *through* the mirror. According to its designer, it simplifies for the beginner the process of ophthalmoscopic examination, by enabling him to see binocularly until he has succeeded in arranging his lens and mirror in proper position. A. J. BALLANTYNE.

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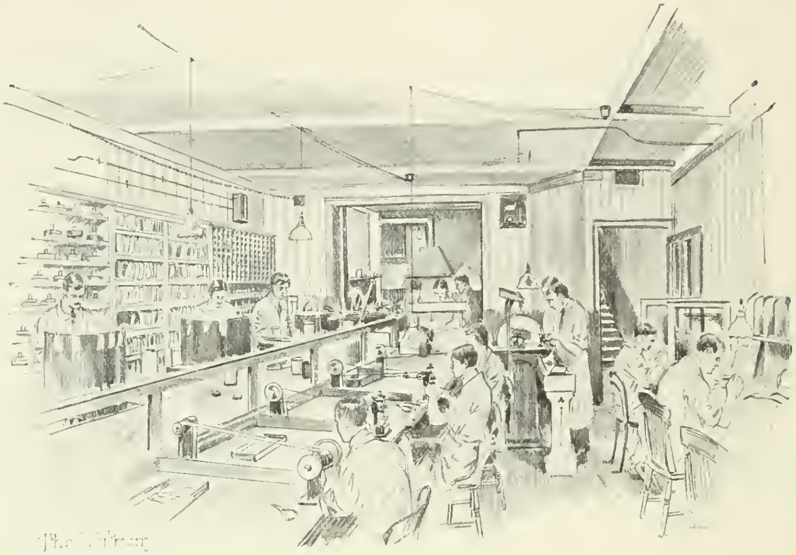

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II.—COMPARATIVE OPHTHALMOLOGY.

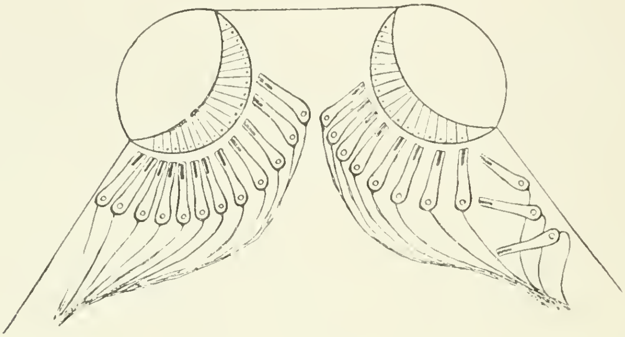
(1) **Buxton, B. H.—The origin of the vertebrate eye.** *Arch. f. vergleichende Ophth.*, Bd. II, Heft iv, S. 405, 22 Februar, 1912.

(2) **Pagenstecher, H. E.—Experimental studies on the genesis of congenital cataracts and malformations in mammals. (Experimentelle Studien über die Entstehung von angeborenen Staaren und Missbildungen bei Säugetieren.)** *Arch. f. vergleichende Ophth.*, Bd. II, Heft iv, S. 424, 22 Februar, 1912.

(1) The origin of the vertebrate eye is one of the most obscure problems in biology. Great as is the gap between the invertebrates and the vertebrates, and few as are the land-marks to indicate by what stages the latter were evolved from the former, the gap is far greater between the invertebrate eye, formed by a simple downgrowth from the cubicle, and the vertebrate, formed partly by a similar downgrowth, partly by a complicated process of outgrowth and invagination from the central nervous system. It is not as though the invertebrate eye were incapable of high development, so that a new system had to be evolved to meet the special requirements of the more highly developed race; on the contrary, the eye of the octopus, for instance, is not only highly developed, but in its general architecture—in its form, in the presence of an iris, lens, vitreous, etc.—it very closely resembles the vertebrate eye; yet it is formed by a simple invagination of the surface epiblast, Why has Nature given up this relatively simple mode of formation, which has proved capable of producing a very highly specialised organ, in order to invent what seems to be an entirely new embryological process?

In the present paper, **Buxton**, of New York, believes he has found traces of the vertebrate type of eye among the spiders. In any sense organ developed from cuticular cells it is to be expected that the stimulus-receiving apparatus shall be developed on the surface, and that the nervous conducting mechanism shall lead off from the deep aspect. So it is with the eyes of invertebrates; the rods are directed towards the skin surface—the retina is "upright." In the vertebrates, on the other hand, in consequence of the development of the nervous portions of the eye from a tube of epiblast which has sunk into the tissues, the surface which was originally external comes to be directed away from the stimulus—the retina is "inverted." This uprightness or inversion is the essential distinguishing mark between the invertebrate and vertebrate eye.

Studying the median and lateral eyes of spiders, Buxton finds that the median eyes are always of the upright type; in the vertebrates, apparently, these eyes are represented by the pineal eye, which shows, as is well known, the invertebrate peculiarities. The lateral eyes, on the other hand, have an inverted retina. The method by which the author supposes this inversion to come about must be studied in the original paper, which is too long for quotation and too condensed for further concentration. Roughly speaking, however, his contention is that in the course of evolution—in the spider, for instance, as compared with the worm—the eyes tend to move towards the middle line in order to give a continuous field of vision in front; this leaves the sides unprotected by vision, especially in animals with a rigid cephalo-thorax, and therefore lateral eyes must be developed; these lateral eyes are produced by budding from the median eyes; during this displacement there is supposed to be a drag on the nervous sensory elements, and if the displacement of the eyes is up the slope of a turret, as it is in some arachnida, the posterior nervous elements might be turned over so that their rod-surface looked inwards (*see* Figure) ; if now a new lens formed in the surface cuticle, a lateral eye with inverted retina would be evolved.



It is not quite easy to see why this turning over should proceed beyond the point of bringing the cell into line with the nerve fibre, nor why it should affect the posterior cells especially ; if there were physical strain through the nerve fibres (and the author speaks as if he postulated an actual dragging), it should act as much, or more, on the anterior cells. But, indeed, it is very difficult to accept the idea that a purely evolutionary striving of the eyes towards the middle line for a remote teleological purpose can be associated with any physical strain.

Even if this theory be correct for the spiders, however, a fatal objection to its application to the vertebrates is that it supposes the reversal of an epithelial visual element, so that the extremity which was originally external comes to be turned away from the cuticular surface. As a matter of fact, no reversal in this sense occurs in the rods of the vertebrate retina ; they are developed on the inner aspect of the optic vesicle, which is continuous with the inner aspect of the neural tube, which, again, is continuous, developmentally, with the external aspect of the surface epiblast. In spite, therefore, of all the involutions which the surface epiblast has undergone to form the neural canal and the primary and secondary optic vesicles, the rods still have their extremities directed towards the primeval cuticular surface, and the arrangement in this respect is the same as in the invertebrate eye.

These objections do not, of course, diminish the interest and importance of the observation that retinæ of the inverted type occur in the invertebrates. It is to the mechanism here described, and its application to the vertebrate eye, that exception is taken.

The paper contains numerous interesting facts about the eyes of the arachnida, and a word of praise is due to the many excellent microphotographs with which it is illustrated. GEORGE COATS.

(2) In the literature of recent years, there has been an increasing, perhaps excessive, tendency to attribute congenital abnormalities to an inherent liability of the germ to vary, a tendency which has played an important part in evolution, but which may exceed the bounds of the normal and give rise to malformations. This view accords with the well-ascertained hereditary transmission of abnormalities, but it does not necessarily exclude the influence, in some cases, of other factors : mechanical, such as amniotic pressure or bands, or chemical, such as toxines acting through the maternal circulation. Inflammation, in the strict sense, has probably only a very limited field of action in the later stages of fœtal life.

The experimental study of the action of poisons on the developing ovum has usually been conducted by very crude methods, having little relation with the conditions of actual life. It would be astonishing, for instance, if an ovum *did* develop as well in a solution of magnesium sulphate or alcohol as in normal circumstances. In the present series of observations, **Pagenstecher**, of Strassburg, starting from the well-known fact that naphthalin caused lens opacity in animals, has attempted to produce similar effects in the fœtal lens by feeding experiments on the mother animal. By suitable adjustments of the dose, etc., he was able to produce cataracts of various forms in thirteen rabbits, and other abnormalities of the lens in three; in ten rabbits and six guinea pigs other abnormalities were present as well—coloboma of the lid, iris, and choroid, microcornea, persistent hyaloid artery, malformed retina, etc. He rejects from his list all cases in which the animals, although showing cataractous changes, were born dead, as the lesions might have been *post mortem*; and suitable precautions were taken by means of control experiments to prove that the changes were really due to the naphthalin and not to any hereditary tendency in the stocks.

It was found that feeding with naphthalin before the lens vesicle was laid down, had no effect in causing cataract. Feeding at the time of the formation of the vesicle caused very gross abnormalities, the lens failing to develop properly and becoming fused with, and invaded by, the surrounding mesoblast, which also persisted unduly. Feeding after the lens vesicle was closed had variable results. It was found that after birth an opacity might clear considerably, and it was probable therefore that the same thing might occur during fœtal life, so that the opacity with which the animal was born might represent only the irreparable remains of a former more extensive cataract. For this reason Pagenstecher believes that it is unsafe to assert that localised opacities are necessarily formed at any given period of fœtal life; a central opacity, for instance, is usually referred to a very early period of fœtal life; but according to these experiments, it may be caused by toxines acting comparatively late. It was found also that very similar changes could be produced by giving the poison at widely different periods of fœtal life. A true lamellar cataract was obtained by naphthalin feeding during and beyond the second third of pregnancy. Very late feeding in one case gave a total cataract.

With regard to the other abnormalities, Pagenstecher believes that the primary fault is in the epiblastic structures—lens, retina, and pigment epithelium—towards all three of which naphthalin plays the part of a specific poison. The maldevelopment or undue persistence of the mesoblast he regards as a secondary phenomenon. The abnormalities of the lids and the microcornea were probably due to the general disturbance of nutrition. If the lids failed to fuse at all, microblepharon would result; if they fused in part only, a coloboma would be formed in the unfused portion.

None of the abnormalities were transmissible to further generations.

George Coats.

III.—DETACHMENT OF THE CHOROID.

Meller, S.—On post-operative and spontaneous detachment of the choroid. (Ueber postoperative und spontane Chorioidealabhebung.) von Graefe's *Archiv f. Ophthalmologie*, Bd. LXXX, 1 Heft, 26 September, 1911.

Fuchs has shown that detachment of the choroid after operations is far from rare. He found it in 4.7 per cent. of the patients after cataract extraction, and in 10 per cent. after iridectomy for glaucoma. **Meller**, of Vienna, himself found it in 22 per cent. after Lagrange's sclerectomy. Meller distinguishes between three forms:—

(1) *Early Post-operative Detachment*, occurring in the first few days after operation. The anterior chamber is empty or shallow, the tension is low, and the ophthalmoscope reveals dark projections of various sizes in the periphery of the fundus, which gradually disappear, the prognosis being entirely good. Fuchs explained the incidence of choroidal detachment by leakage of the aqueous humour into the suprachoroideal space through a tear in the ligamentum pectinatum. Meller does not agree with this view, but thinks that the detachment is rather due to increased transudation from the corpus ciliare and contraction of the vitreous. An abnormal current is thus produced, the fluid portion of the vitreous being expressed into the anterior chamber while part of the newly formed aqueous humour oozes into the suprachoroideal space. It is also essential for the pathology of this process that the sclera should be abnormally rigid. The softening of the eye is due to the wound not being perfectly closed.

(2) *Late Post-operative Detachment.*—Several cases of this kind have been recorded by Graefe, Liebreich, and C. Devereux Marshall, to which Meller adds two of his own. Retinal detachment, as a rule, supervenes, and makes the prognosis very unfavourable.

(3) *Spontaneous Choroidal Detachment.*—Here we can distinguish between two forms: the first begins in the neighbourhood of the ciliary body and progresses backwards similarly to the early post-operative form, but generally leads to retinal detachment. The second type affects the posterior part of the choroid; the transudation takes place between retina and choroid, as well as behind the latter membrane, and the clinical aspects vary greatly in consequence; sometimes the symptoms of retinal detachment prevail, so that the choroidal detachment can be easily overlooked. It is very doubtful whether this does not sometimes happen in the typical serous detachment of the retina in myopia. R. GRUBER.

IV.—TOTI'S OPERATION.

(1) **Torok, E.—Dacryocysto-rhinostomia (Toti's operation).** *Archives of Ophthalmology*, May, 1911.

(2) **Toti, A.—The results of rhinostomy of the tear sac (Dacryocystorhinostomy) after my seven years' experience. [Die Resultate der Rhinostomie des Tranensacks (Dakryocystorhinostomie) nach meiner siebenjährigen Erfahrung.]** *Zeitschrift für Augenheilkunde*, Februar, 1912.

(1) **Torok** reviews the treatment of stenosis of the lacrymal duct. Apart from operation, he finds the regular introduction of the probe once a week or so by the patient himself the only way of giving permanent relief. Torok considers that Toti's operation, which he describes in detail, has "solved the *punctum saliens* of the whole question." With this operation, Toti has had 23 perfect results out of 39 cases; there were 16 cases in which slight watering of the eye remained. The longest observation was five years. At the New York Ophthalmic Institute the operation had been performed nine times, all being cases of chronic purulent dacryocystitis of several years' standing.

General narcosis was used except in one case, but the author thinks that local anæsthesia is quite satisfactory. Perfect results were obtained in six cases, in two cases there is now moderate watering, and in the ninth case there is no secretion but watering. Longest observation nine months.

ROSA FORD.

(2) **Toti**, of Florence, commences his paper by a cordial invitation to his colleagues who happen to be in Florence, to visit him and to see his results for themselves. He states that failure to achieve a true filtration into the nose is due to faulty *technique*, the chief fault being making the window in the bone too small. The detailed descriptions of the operation are to be found in the *Zeitschrift für Augenheilkunde*, 1910, Heft 3; the *Clinica Oculistica*, 1910, Aprile-Maggio; and the *Annales d'Oculistique*, juin, 1910. Toti's results have improved *pari passu* with increasing experience and skill, and he now has a large number of perfectly cured cases in whom solution of fluorescein placed in the conjunctival sac spontaneously appears in the nose. The paper draws attention to some new facts, one is that where there has been chronic suppuration there is considerable thickening of the bone which has to be removed, the result of a periostitis chronica hyperplastica ossificans, and this hyperostosis may render the manipulations more difficult. The window must be large, never measuring less than 12-15 mm. by 10-12 mm. The situation in which it should be made is clearly illustrated by two wood cuts, one showing its boundaries from the outside, the other the actual opening seen within the nose (an anatomical preparation). The operation must be performed in most cases under local anæsthesia. Novocain and adrenaline are injected externally and cocaine and adrenaline in the nose. Angled chisels, which cut by drawing them from behind forwards, are useful adjuncts in removing splinters of bone. In resecting the nasal mucous membrane it is unnecessary to push it outwards by placing the finger in the nose. The nasal packing does this sufficiently. The first incision in it should be made with a knife. The sutures are best double armed. The exact apposition of sac and nasal mucous membrane by means of these sutures is important. The dressing should make firm pressure upon the wound.

T. HARRISON BUTLER.

V.—THE VISUAL FIELD.

(1) **Kooy, T. M. and Kleijn, A. de.—On a few cases of affection of the optic nerve and the "island"-shaped form of visual field in these cases. (Ueber einige Falle von Optiensleiden und inselformige Gestaltung des Gesichtsfeldes bie diesen Erkrankungen.)** von Graefe's *Archiv f. Ophthalmologie*, Bd. LXXVII, 3 Heft, 20 Dezember, 1910.

(2) **Hoeve, J. van der.—Enlargement of the blind spot, an early symptom in the diagnosis of optic nerve affections, due to disease of the posterior nasal accessory sinuses.** *Archives of Ophthalmology*, January, 1911.

(3) **Kleijn, A. de.—Studies on diseases of the optic nerve and of the retina. II. On the ophthalmological symptoms in tumours of the hypophysis and their variability. (Studien über Optikus- und Retinaleiden. II. Ueber die ophthalmologischen Erscheinungen bei Hypophysistumoren und ihre Variabilität.)** von Graefe's *Archiv f. Ophthalmologie*, Bd. LXXX, 2 Heft, 7 März, 1911.

(4) **Fuchs, E.—The field of vision in tabetic atrophy of the optic disc.** *Trans. Amer. Ophth. Society*, Vol. XII, Part III, 1911, p. 718.

(5) **Williams, Tom A.—A convenient method to test the visual fields for colour without the use of a perimeter; for application in cases suspected of increased intracranial tension.** *Lancet*, August 19th, 1911.

(6) **Gjessing, Harold G. A.—On van der Hoeve's symptom and the annular scotoma of rhinogenic origin. (Ueber van der Hoeve's Symptom und die Ringscotoma rhinogenen Ursprunge.)** von Graefe's *Archiv f. Ophthalmologie*, Bd. LXXX, 1 Heft, 26 September, 1911.

(7) **Fuchs, E.—The visual field in tabetic atrophy of the optic nerve.** *Anales de Oftalmologia*, Diciembre, 1911.

(1) If the optic nerve is only partly affected, it seems curious that the visual defect should always show an unbroken demarcation against the normal portion. **Kooy** and **Kleijn** think that this is indeed often due only to the usual test by the perimeter, and that if the campimeter be used instead, "islands" of retained vision area are often found within the affected portion. Snellen's campimeter is a black board of square shape, the outline of which is seen at an angle of 45° by the fixing eye. In consequence, fields can not be taken beyond this angle and there are also other drawbacks, but details can be detected which delude the examiner who relies upon the perimeter only. The authors attach great importance to latent affections of the posterior nasal sinuses in the causation of optic atrophy, and advocate surgical treatment accordingly, even where external symptoms of empyema are absent.

R. GRUBER.

(2) **Hoeve** reports six cases of disease of the posterior nasal accessory sinuses in which, in every case, enlargement of the blind spot occurred, while the peripheral limits of the field were normal except for a slight limitation for colours in one case. In four of these cases the optic nerve affection was bilateral, the affection of the nasal accessory sinuses being in one of these cases also bilateral. The enlargement of the blind spot was present in one case, also reported, in which the disease was in the maxillary antrum, and the author explains this as due to the fact that the pus in the antrum was in a high state of tension and there was therefore probably some extension of oedema and circulatory disturbances over a greater area than is usually the case in this disease. All the cases in which the nasal condition was treated improved considerably or were entirely cured (4). The two untreated cases went from bad to worse. The enlargement of the blind spot was absent from all the cases examined by Kleijn of disease of the nose, frontal sinus, and maxillary antrum, without disease of the accessory sinuses, whilst in 52 cases of posterior accessory sinus disease he found enlargement of the blind spot for white or colors in 47.

From these facts, Hoeve draws the conclusions.—1. In cases of nasal disease, where there is doubt whether the posterior accessory sinuses are involved, it is necessary to examine for scotomata of the blind spot, for white and colours. 2. Enlargement of the blind spot for white and colours points with great probability to disease of the posterior nasal accessory sinuses, and justifies operative interference for this disease, if there are no other causes for the presence of the peripapillary scotoma. 3. Early treatment of the posterior accessory sinus disease can cure the resultant optic nerve affection.

The other possible causes of a peripapillary scotoma are medullated nerve fibres, circumpapillary retinal atrophy in myopia, choked disc, and other abnormalities which enlarge the disc, all of which can be readily diagnosed by the ophthalmoscope; and diseases, such as retrobulbar optic nerve affections, other optic nerve diseases in the optic canal, and tumor of the hypophysis cerebri.

That there is enlargement of the blind spot in almost every case of disease of the posterior nasal accessory sinuses is explained by the fact that the point of attack is always near the optic canal and therefore the peripapillary bundles of fibres in the nerve are involved first. According to Fuchs, these peripheral bundles supply that portion of the retina bordering on the disc; thus, affection of these bundles produces enlargement of the blind spot. In retrobulbar neuritis, the papillo-macular and peripapillary fibres are usually affected alone, or long before the remaining fibres of the nerve. In sympathetic ophthalmia, the papillo-macular and peripapillary fibres may become involved. Hoeve regards this as of great importance, since this symptom, if it were often found, would be of great value in the prognosis and therapy of sympathetic ophthalmia. Charts showing the scotomata in the cases reported are given.

ROSA FORD.

(3) Tumours of the hypophysis are amongst the best understood and easiest diagnosed affections of the brain, but they show some peculiarities which are not yet sufficiently appreciated. A point which must be well borne in mind, is the considerable fluctuations of vision, and of the visual fields, which are apt to occur even from one day to the other. The two eyes often show considerable discrepancies, and diminution in the visual field may accompany an improvement of sight. This imposes upon us the duty of carefully weighing the evidence before pronouncing upon the efficacy of any form of treatment. This change of symptoms may be in certain cases due to the bursting of a cyst within the tumour, but in others it is a change of circulation only which relieves the pressure upon the optic nerves. Similar fluctuations also occur in other affections of the brain. It is also idle to consider in what percentage of cases bitemporal hemianopsia supervenes; it may be present in its most typical form one day, and absent the next, or be present for white and not for blue, or *vice versâ*. The same applies to the islands which are often spared within an otherwise destroyed part of the field. Among other minor symptoms which are often associated with tumour of the hypophysis, **de Kleijn** mentions blue vision and optical illusions. It is also very interesting that during temporary amaurosis, as it sometimes occurs in this disease, the direct reaction of the pupil to light may be absent. Although optic neuritis is here rarer than in any other tumor of the brain, it sometimes occurs, even in cases where simple optic atrophy was found before; on the other hand, we may find simple atrophy with a history of preceding neuritis.

With regard to surgical treatment, the following points must be borne in mind.—(1) The average duration of life in patients who have not been operated upon is very considerable; (2) every operation is attended with very great risk; (3) a radical removal of the tumor is hardly ever possible and a partial one may lead to a more rapid growth of the tumor. There is also considerable danger of damage to the optic nerve during the operation. de Kleijn's advice is therefore not to operate in any but the gravest cases; to perform palliative trephining or drainage of the ventricles in cases of marked intracranial pressure, and to resort to Schloffer's radical operation in desperate cases only. In cases with serious ocular complications, one might try puncture through the sphenoidal sinus, if the presence of a cyst is presumed.

R. GRUBER.

(4) **Fuchs,** of Vienna, enquires into the nature of the central scotoma found, according to Uhthoff, in about 20 per cent. of all cases of tabetic

atrophy. He does not agree with the common view, namely, that the scotoma is due to a simultaneous syphilitic retro-bulbar neuritis. On the contrary, Fuchs holds that it forms an integral part of the tabetic process. Similarly, he considers bi-temporal hemiopia, very rarely observed in cases of tabes, not as an accidental complication due to syphilitic inflammation, but as a genuine tabetic affection. SYDNEY STEPHENSON.

(5) **Williams'** simple method may be given in his own words.—"To measure this inversion or interlacement of the colour fields accurately a perimeter is, of course, required, but I have found that the inversion may be ascertained roughly by the following method: The patient sits with his back to a good light looking fixedly at a point in the distance. He is directed to signal as soon as he perceives any movement. The visual field is then approached by the observer's hand, which holds alongside and parallel two objects coloured of an intense pure bright red and blue respectively. After the patient signals, he is asked to signal again as soon as he perceives any colour, while the centre of the field is very slowly approached. The observer then stops the movement and asks what colour is seen. To corroborate, the movement is then continued until the other colour is also seen. In normal persons blue is always seen before red. If this is not the case, increased tension may be suspected. In two recent cases, one of tumour and one of albuminuric retinitis, this method has been as positive as that with the perimeter."

(6) **Gjessing,** of Drammen, Norway, describes a rather interesting case from Fuchs' clinic.—A farmer, 20 years of age, was suffering from double optic atropy with great reduction of vision, which had developed within six months. He had colour blindness and a very curious annular scotoma in both eyes (white disappeared in the horizontal meridian temporarily between 72° and 60°, 50° and 40°, 32° and 20°, 15° and 5°, and usually between 15° and 25°). There was also paresis of the facial nerve, increase of knee-jerk on one side, and double ethmoidal empyema, the drainage of which resulted in some improvement of vision. Annular scotoma in optic nerve trouble of rhinogenic origin is uncommon, although it has been reported by Russ Wood and Ham. The usual disturbances of the visual fields are either a central scotoma, first for colours only (Birch-Hirschfeld) or according to J. van der Hoeve, enlargement of the blind spot first, and during the further progress of the trouble as central scotoma, which finally becomes confluent with the blind spot. R. GRUBER.

(7) Uhthoff has estimated that about 20 per cent. of cases of tabetic atrophy show central scotomata, and it is generally assumed that this curious anomaly is due to a concurrent retro-bulbar neuritis. **Fuchs**, of Vienna, has found these scotoma in comparatively a large number of cases, and wishes to prove that there is no concurrent disease, such as has been supposed.

The scotoma is in almost all cases (Fuchs has seen thirty such among his own patients) bilateral. At first, the scotoma is small and central; in this stage the blind spot is a little enlarged. Later, as the scotoma increases in size, the increase takes place on the temporal side (of the field) until it joins the blind spot; there then results an oval defect, with the greater diameter transverse.

At the same time as the scotoma appears, the periphery of the visual field becomes diminished. The colour field suffers more than that for white. An early total loss of colour perception is of grave import as indication of a malignant character of tabes.

The diagnosis from other forms of central scotoma is not always easy; the conservation of the visual field for colour and white, will enable us to distinguish the sufferers from tobacco blindness ; it is more difficult to separate the cases of retrobulbar neuritis of syphilitic origin. Fuchs gives, as distinguishing characters, the favourable influence of treatment ; and the later development of pallor of the disc. He has never seen a case in which there was no evidence of tabes, although such have been recorded.

In the case in which there is a central scotoma, the appearances of the disc differ somewhat from those of simple atrophy ; in the former the colour of the disc is yellowish, and the details of the lamina cribrosa are not visible. The edges of the disc are not quite clear ; the vessels are rather small.

Another rare anomaly of the tabetic field is bitemporal hemianopsia ; of these, Fuchs has seen six only. In one case, the development was rapid ; energetic treatment stopped the course of the disease, and the patient retained good vision. Generally, however, this symptom is a sign of malignancy, and the condition rapidly becomes worse. HAROLD GRIMSDALE.

VI.—THE EYE IN MONGOLIAN IMBECILES.

Ormond, Arthur W.—Notes on the ophthalmic condition of forty-two Mongolian imbeciles. *Trans. Oph. Soc. U.K.*, Vol. XXXII, Fasc. 1, 1912, p. 69.

These remarks are based upon the examination of the eyes of forty-two cases of Mongolian imbecility by **Ormond**, of London, in various metropolitan institutions. Over one-half presented some lental defect, while almost all had some ocular abnormality, such as maldirection of the palpebral fissure, epicanthus, blepharitis, ectropion, strabismus, or nystagmus. The lens opacity was seldom complete. It might assume various forms, the "dotted" variety being, however, that most commonly met with. It occupied what might be termed the "lamellar position." The posterior pole of the cataract was frequently marked by a star-shaped opacity. In short, the more fully developed cases might be described as lamellar cataracts, and the slighter, as "congenital dot" cataracts. The youngest patient in whom lental opacities were found was aged 6½ years, and the oldest 43 years. For comparison it may be stated that the average age of Ormond's Mongolians was 14¾ years, the oldest being 43 years and the youngest under two years. The exact figures of the ocular defects were as follows.—Total, 42 cases of Mongolian idiocy. Lens opacity, 59.5 per cent. ; maldirected palpebral fissures, 54.76 per cent. ; blepharitis or ectropion or both, 42.8 per cent. ; epicanthus, 26.2 per cent. ; squint, 21.4 per cent. ; and nystagmus, 11.9 per cent.

The point brought out by Ormond's communication is the frequency of lental changes in cases of Mongolian idiocy. Indeed, the proportion is so high as to lead the author to suggest that such changes "may be looked upon as an aid to diagnosis in doubtful cases." SYDNEY STEPHENSON.

VII.—"JAW-WINKING" MOVEMENTS, &c.

(1) **Robson, Herbert J.—The synchronous movements of the lower eyelids with the tongue and lower jaw observed in certain diseases.** *Lancet*, December 14th, 1907.

(2) **Parsons, L. G. (Birmingham).—Associated jaw and lid movements.** *Transactions Ophthalmological Society U.K.*, Fasc. 2, 1910.

(3) **van Lint.—Movements of the left upper eyelid associated with movements of mastication.** *La Policlinique*, No. 4, 15 février, 1911.

(4) **Gaultier, René, and Bucquet, A.—Jaw-winking phenomenon. (La machoire à Clignements.)** *Gazette des Hôpitaux*, 27 avril, 1911.

(1) **Robson**, of Leeds, in 1905, described, and at the present time again emphasises, a movement of the lower lids synchronously with protrusion of the tongue in cases of severe illness, acute or chronic. On protrusion of the tongue or depression of the lower jaw there is a slight eversion of the lower eyelids quite apart from any tendency to ectropion. Robson states that the sign is not detected unless specially looked for, and is never present in health. He regards it as an associated movement due to the contraction of "the malaris fibres of the orbicularis palpebrarum muscle as described by Haile." Further observations are desired. ERNEST THOMSON.

(2) An interesting discussion took place on **L. G. Parson's** case of an infant at the breast, who exhibited associated left-sided jaw and lid movements. There was ptosis of the left eyelid. Bishop Harman's explanation (*Transactions Ophth. Soc.*, Vol. XXIII, p. 370) was given, namely, that the condition is an atavistic anomaly. R. W. Doyne asked why, if this be the correct explanation, one eye only was affected. To this Harman replied that the answer lay in the fact that the ptosis was only on one side; only one levator palpebræ was weak. The atavistic explanation of the phenomenon might seem far-fetched, but to a comparative anatomist it presented no difficulty, whereas a nerve transference—as assumed in the finding of the Society's Committee, namely, the levator palpebræ innervated from the third nucleus and external pterygoid by portions of the fifth nucleus—was the most difficult of freaks to conceive. Harman went on to say that the movement seemed to disappear in adult life, and he supposed that the subjects of it learned to get control of their facial muscles just as our primitive ancestors must have done. Beaumont (Bath) remarked that it was an error to say that the symptom always disappeared in adults. The late Marcus Gunn had shown cases in adults. Tatham Thompson had seen a case of an adult who had this associated movement all his life, but who, as far as was known, had never had ptosis.* ERNEST THOMSON.

(3) In 1908 **van Lint**, of Brussels, presented to the Belgian Ophthalmological Society a girl of five years affected with associated movements of the jaw and eyelid. The case was peculiar in that there was no concomitant ocular change. On this occasion he describes the case of a girl, aged 11 years, whose left upper eyelid moved up and down whenever the mouth was opened and shut in eating. There were, however, other obvious muscular disturbances, such as slight left ptosis and intense nystagmus of both eyes during lateral movements of the eyes, especially when the latter were turned towards the left. Myopia, 1 diopter. SYDNEY STEPHENSON.

(4) From what **Gaultier** and **Bucquet** (Paris) say about the "jaw-winking phenomenon," the cases must be very rare in France. They state that while there are some forty cases in the literature, only five of these are acquired cases, most of the remainder being cases of congenital ptosis. "So it may be interesting to complete the half-dozen with this new case and to discuss the pathogenesis, which is still doubtful." The jaw-winking

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* For report of such a case see p. 373 of the present issue of THE OPHTHALMOSCOPE.—Editor.

phenomenon came on in this case in association with a transitory attack of paresis of the left side of the face and body. The patient did not present himself for examination for a fortnight, by which time, while the jaw-winking phenomenon persisted, the paresis had totally disappeared. Examination revealed no other morbid sign than a sensation of dryness of the mouth and of swelling of the gums, corresponding to which there was glycosuria of 12 grammes per litre. In explanation of the phenomenon in this case the authors say:—" If we admit that normally there are associated movements of elevation of the upper lid and of depression of the lower jaw, which is certainly the case in a great number of normal subjects, it is possible to think that in our patient in whom, when at rest, the eyelid had a slight droop, the struggle between the elevator and the orbicularis becomes unequal in the course of this associated movement, owing to the muscular hypotony of this side, and therefore brings about exaggeration of the normal movement."

ERNEST THOMSON.

VIII.—STRABISMUS.

(1) Delord.—Simulation of a high degree of amblyopia in a case of alternating strabismus. (Simulation d'une amblyopie élevée dans un cas de strabisme alternant.) *Ann. d'Oculistique*, T. CXXXVI, p. 311.

(2) Aubineau.—Researches on the ætiology of strabismus. (Recherches étiologiques sur le strabisme.) *Ann. d'Oculistique*, février, 1910.

(3) Krusius, F.—Clinical observations on the treatment of squint with the amblyoscope. (Klinische Bemerkungen z. Amblyoscopetherapie bei Schielenden.) *Arch. f. Augenheilk.*, April, 1910.

(4) Deloge.—Some remarks on the nature and treatment of squint. (Quelques remarques sur la nature et le traitement du strabisme.) *Recueil d'Ophtalmologie*, juillet and août, 1910.

(5) Caillaud.—A contribution to the study of the pathogeny of amblyopia ex anopsia and strabismus. (Contribution à l'étude de la pathogénie des amblyopies ex anopsia et du strabisme.) *Ann. d'Oculistique*, décembre, 1910.

(6) Roenne, H.—Ætiology and pathogenesis of secondary strabismus divergens. (Aetiologie und Pathogenese des secundeier Strabismusdivergens.) von Graefe's *Archiv für Ophthalmologie*, Bd. LXXVIII, Heft i, 17 Januar, 1911.

(7) Emerson, Linn.—The etiology, pathology, and treatment of concomitant, convergent squint. *Ophthalmology*, January, 1911.

(8) Mulder, W.—Modern treatment of squint. *Transvaal Medical Journal*, January, 1911.

(9) Terrien, F.—Remarks on fusion. Simple method of demonstrating latent strabismus. (Remarques sur le Fusionnement. Moyen simple de détermination des strabismes latents.) *Archives d'Ophtalmologie*, février, 1911.

(10) **Blanco, Tomas.—Ought we, in the treatment of strabismus, to weaken the muscle which appears to cause the deviation, or to strengthen the opponent? (Se debe en el estrabismo debilitar el musculo hacia el que el ojo aparece desviado, o reforzar el antagonista?)** *Arch. de Oftal. Hisp.-Amer.*, Abril, 1911.

(11) **Ziegler, S. Lewis.—Bilateral partial tenotomy, with a Greek cross test-object for use during operation.** *Ophthalmology*, April, 1911.

(12) **Hird, R. Beatson.—Squint and its treatment.** *Birmingham Medical Review*, May 15th, 1911.

(13) **Gonin.—On procedures to replace tenotomy in operating for squint. (Des procédés aptes à remplacer la ténotomie dans l'opération du strabisme.)** *Ann. d'Oculistique*, mai, 1911.

(14) **James, Rupert.—A plea for the operation of advancement in cases of strabismus.** *Transvaal Medical Journal*, August, 1911.

(15) **Bielschowsky.—Unusual causes of unsuccessful treatment of squint. (Ungewöhnliche Ursachen von Misserfolgen in der Therapie des Schielens.)** *Archiv für Augenheilkunde*, Bd. LXIX, Heft i.

(1) **Delord** records the case of a young man with an alternating squint and good vision in each eye, who being able to tell with which eye he was squinting, pretended to have a monolateral squint with a high degree of amblyopia in the deviating eye and succeeded in getting himself declared unfit for military service.

(2) **Aubineau** gives particulars as to the frequency of strabismus in his practice in the neighbourhood of Brest, and of the relationship between the disease and errors of refraction, corneal leucomata, etc. The paper should be consulted in the original by those interested in the statistics of the subject.

R. J. COULTER.

(3) **Krusius** wishes to show that the amblyoscope may be employed either in the manner usually adopted, *i.e.*, to train the fusion sense first and then to bring the eyes into parallelism, or that it may be used to drive the eyes into parallelism first and to develop the fusion sense afterwards. In the first case a strongly developed power to fuse two similar images and an aversion to diplopia brings and maintains both eyes in a normal position; in the second case the disinclination to fuse the images is used to drive the eyes into a parallel position, *e.g.*, if in a case of convergent strabismus we place the arms of the amblyoscope in a position of extreme convergence and then gradually separate them, a point will be reached when the images will fall upon identical parts of the retina and fusion should result. Instead of this, however, a disinclination to fuse the images causes the internal recti to relax, so that the eyes become parallel. Systematic exercises upon these lines may cure a squint before fusion has been established, but in order to maintain the eyes in parallelism, the patient must finally learn to fuse the images. P. J. HAY.

(4) **Deloge** discusses the various theories which have been put forward to explain the production of squint, and favours that of Parinaud, who regards it as of central origin—essentially a disturbance of binocular vision.

Thus is explained the part played by infectious diseases, syphilis, consanguinity, alcoholism, etc., in the production of squint. He does not deny the paramount importance of errors of refraction in certain cases.

He also shows that squint—either manifest or latent—is frequently developed in adults, even when vision is good in both eyes. Such cases recover quickly when any existing ametropia is corrected and the patient is put on a course of exercises with Rémy's diploscope, which the author finds the most effectual of all the devices suggested for the orthoptic treatment of squint. He does not recommend operative treatment before the age of twelve. He naturally corrects all errors of refraction, and begins orthoptic treatment as soon as the vision in the squinting eye reaches $\frac{1}{10}$th.

He does not recommend the use of an obturator over the good eye, as he finds it troublesome and ineffectual. He finds it better to have the child closely superintended while reading, etc., and the sound eye bandaged during this period of supervision.

The stereoscope is also a difficult instrument for parents and patients to use. Further, stereoscopic vision is not the same thing as normal binocular vision. The author uses the stereoscope when he wants to get a slight over-correction of a convergent squint, as the stereoscope tends to produce a parallelism of the optic axes, a relative divergence. It is therefore to be avoided after the cure of a divergent squint.

In the causation of divergent squint, the author insists on the part played by insufficiency of convergence, which if associated with marked deviation, demands operative treatment. Operation is not necessary in all cases, however. He counsels careful correction of error of refraction, abolition of suppression by setting up diplopia by means of the diploscope, coloured glasses, unequal illumination, and the use of prisms. He finds that in this way orthoptic exercises give brilliant results in divergent strabismus. J. JAMESON EVANS.

(5) With a view to elucidating the relationship between amblyopia ex anopsia, anisometropia, and strabismus, **Caillaud**, of Paris, has collected 78 consecutive cases in which one or more of these conditions were present, and classified them into 25 groups according to the amounts of amblyopia and anisometropia present. The refractions and visions given are those found at the first examination, often without atropine. From his investigation he draws the following conclusions.—Amblyopia without any lesion is usually congenital, but may be acquired and due to disease. Age has no influence on the degree of amblyopia which occurs in hypermetropia, myopia, and astigmatism, and is not due to weakness of accommodation. Amblyopia precedes strabismus, which has no influence on its evolution. It ceases to develop when the strabismus becomes fixed in one eye, which only happens when the vision of the deviating eye is inferior to that of its fellow. The degree of anisometropia appears to have the greatest influence on the amount of the amblyopia, which is the greatest when the difference between the refraction of the eyes is slight, or greater than 8D., but is never serious when the amount of the anisometropia is between 3D. and 8D. In so far as the above conclusions are novel or debatable, the reviewer cannot find any sufficient proof of them in the article. For instance, there is no evidence to show whether the slight degree of anisometropia causes the high degree of amblyopia or *vice versá*.

R. J. COULTER.

(6) This paper, by **Roenne**, is based on the statistics of the Copenhagen clinic, extending over the last forty years. During this period 3,865 operations for convergent squint were performed, and in 211 cases an operation for secondary divergent squint became necessary. This number includes cases where the primary operation was performed elsewhere, but this, no doubt, excludes cases which went for a second operation to another place, and some no doubt never underwent another operation at all. In discussing his statistics, Roenne sees no reason why operation should not be performed at an early period. The operation usually resorted to was single and double tenotomy, the latter resulting about twice as often in divergence, but he does not think

that the danger of over-correction is greater in slight squint; also the immediate effect is no safe criterion, for although cases of over-correction during the operation itself resulted in a somewhat greater proportion of divergence afterwards, this event also frequently took place where the squint was first under-corrected. Roenne's cases include comparatively few advancements (6 without, and 96 with, tenotomy), but he does not admit any advantage for this operation as far as the prevention of secondary divergence is concerned.

R. GRUBER.

(7) **Emerson**, of Orange, N.Y., accepts Worth's theory as to the origin of strabismus, but thinks we may go further, and assume the existence of a fusion centre. Loss or deterioration of the fusion faculty may be due to a defect of the fusion centre, but may equally well be caused by congenital orbital or muscular abnormalities, congenital or acquired amblyopia, or anisometropia of high degree, the centre itself being intact. Of course, as such a centre has to undergo a process of development, it may also deteriorate after it has developed. This would explain the anomalous case of the myope who develops a divergent squint at the age of seven to twelve years—that is, after the supposed full development of the fusion centre. He believes no child is too young to begin treatment for convergent squint. Children of a few months should be given atropine to the fixing eye a few times a week. Prognosis in these cases should be guarded, since the squint may have an underlying cause which precludes the acquisition of good vision. He rarely prescribes glasses before the age of twelve months. He orders the full correction in the fixing eye and 0·5D less in the squinter. A drop of 5 per cent. atropine is put in the fixing eye every morning, and it is occluded for half to three hours. When the child is old enough, the amblyoscope is employed by the oculist, and the stereoscope at home. Practically all private patients do well, but about 50 per cent. of hospital cases fail, probably because of inability to carry out the treatment properly at home. He believes in the value of early operative treatment combined with orthoptic treatment. He advises tenotomy only if double advancement proves insufficient. He describes an advancement operation in which the tendon of the muscle is cut through close to the eyeball, and split longitudinally, the upper and lower halves being then anchored respectively to the superior and inferior rectus muscles.

A. J. BALLANTYNE.

(8) **Mulder**, of Pretoria, describes a method which he has found successful in restoring sight in eyes more or less blinded by squint. This he accomplishes by re-educating the cones of the macula lutea by means of coloured letters and pictures projected into a blackened box by aid of a powerful magic lantern. The patient looks into the box through an aperture at one end, and the coloured images are thrown upon another aperture at the other end of the box closed by a screen of transparent paper, $\frac{3}{4}$ inch square. Ultra-violet rays are absorbed by a mixture of triphenylmethan (35) and xylol (10) interposed between the source of light and the screen. Under these circumstances the light can be made very powerful without risk of damage to the delicate tissues of the retina. The appliance is used at regular intervals.

Incidentally, Mulder narrates the case of a patient upon whom he operated on both eyes for inflammatory glaucoma. The left eye was amblyopic, in consequence of a squint in childhood. The other (right) eye did badly, on account of an intraocular hæmorrhage, which occurred on the third day after operation. But the amblyopic eye regained V.=5/8. Even when the hæmorrhage had cleared up, the left eye remained the better of the two. The author mentions analogous cases reported by Bielskowsky, Straub, and others.

SYDNEY STEPHENSON.

(9) **Terrien**, of Paris, discusses suppression in the normal state and in the squinting eye, and refers to the experiments of Helmholtz and others to show alternating suppression in the two eyes.

He describes a useful method for the rapid determination of abnormal convergence as follows.—A small movable metallic pointer is fixed in the upper part of one of the two horizontal holes in Rémy's diploscope; for example, the right one, when the letter "O" is looked at the heterophoric sees two holes instead of one, and in each he sees an "O," if excessive convergence be present the "O" in the circle with the pointer is referred to the right (homonymous localisation), and to the left in the case of weak convergence (crossed localisation). The paper is interesting, and is best read in the original. BERNARD CRIDLAND.

(10) **Blanco** is of opinion, which is probably shared by most ophthalmic surgeons, that the advancement operation is more surgical, and less likely to be followed by disagreeable accidents, than tenotomy. All operations must be calculated, as far as possible, to give the effect demanded by the individual case, and must be aided by orthopœdic exercises to teach and to maintain, in all possible cases, the function of binocular vision. HAROLD GRIMSDALE.

(11) **Ziegler**, of Philadelphia, shows that the operation of partial tenotomy dates back to von Graefe, who described the operation and the indications for it in such completeness of detail as would to-day have placed him in the very front rank of the so-called "muscle faddists." He describes briefly the history of the operation, and illustrates by a plate the character of the incisions recommended by von Graefe, Abadie, Stevens, Verhoeff, Todd, and the author himself. Another plate illustrates, in two figures, the author's own method. The tendon of the muscle is divided through a third of its width from each side, leaving the middle third intact. The superficial fibres of this part are then carefully snipped away until sufficient elongation is obtained to give orthophoria. The result is controlled by testing in the course of the operation. It is stated that it is usually necessary to carry the eye to orthophoria or 1/2° beyond in vertical deviations, and 1° beyond orthophoria in horizontal deviations, in order to allow for the contraction of healing. The tendon should not be completely divided, as it is better to augment the effect by operating on the fellow eye. By this operation it is possible to gauge an effect ranging from 1/2° to 6° or 8°.

The test object recommended for use before and during the operation, is a cross composed of vertical and horizontal arms cut out of black metal and placed against an illuminated background of white porcelain. It is claimed that the object is readily recognised in spite of the blurring of vision produced by cocaine and the presence of fluid in the conjunctival sac, and also that the vertical and horizontal positions of the limbs of the cross assist the patient in the alignment of the two images. A. J. BALLANTYNE.

(12) This paper, by **Hird**, of Birmingham, is on lines suitable for a general medical audience. It calls for no comment.

(13) In operating for squint, when a sufficient result can not be obtained by a simple advancement, **Gonin**, of Lausanne, prefers to split the tendon and advance its halves above and below the cornea rather than to resect part of it, but, in addition to the two sutures usually recommended, he inserts a third. This is passed in and out through the centre of the tendon just beyond the end of the split and similarly through the tissues at the corresponding part of the corneal limbus, and serves to prevent the new attachment of the tendon from being displaced upwards or downwards from undue tightening of either of the other threads. When a weakening of the overacting muscle is indicated, the author performs a partial tenotomy if the effect is to be temporary,

but if he wishes it to be permanent, he prefers the following modification of methods of tendon lengthening suggested by Sydney Stephenson and Landolt.—The tendon is exposed and its upper and lower third having been separated from their scleral attachments a suture of reindeer tendon is passed through each of them. The sutures are then held apart and the upper and lower thirds of the tendon are separated longitudinally for whatever distance has been judged advisable (4 to 8 mm.) from the middle third, which is then divided, leaving a tongue of tendon attached to the sclera to which the ends of the freed tendon are united by means of the sutures already inserted in them. The author considers that this operation gives a straighter pull on the eye than either the oblique or the staircase section of the tendon, and quotes cases in which he has performed it with good results.

R. J. COULTER.

(14) **James,** of Johannesburg, voices the advantages of the operation of advancement in dealing with cases of squint, although he is not an advocate of the extreme position taken up by Landolt, who performs that operation in one or both eyes in all instances of strabismus. SYDNEY STEPHENSON.

(15) This paper, by **Bielschowsky**, of Leipzig, deals with operative failure of squint. Cases fall into three groups.—1. The fully successful cases where binocular vision is obtained. This is only possible when there is no amblyopia or congenital defect of fusion. A large number of cases must fall into group 2 which are only partly successful, the cosmetic result being good without binocular vision. In group 3 are the unsuccessful cases, these being due to either want of success in removing muscular anomaly, or to the onset of subjective trouble afterwards. Faulty operative *technique* may be the factor in some cases, but others will fail in the hands of the best surgeons. Bielschowsky lays down the following rules as to when operative treatment should be undertaken :

I.—Only when correction of the squint cannot be brought about except by adjustment of the muscular apparatus.

II.—An unimpaired motility of the eye must be assured afterwards. Thus, in squint due to hypermetropia, glasses, fusion training, etc. should be tried first for fear a divergence develops after operation.

Operation on paralytic squints should be avoided, as they may clear up under proper general treatment.

Nor is operative treatment advisable in insufficiency of convergence and latent divergence, for what the near vision gains the distant loses. Many of the cases which are given in detail concern divergent and vertical squints.

In some cases of failure there may be anatomical factors at the bottom of them, but much more frequently nervous anomalies are the cause of unsuccessful treatment, especially want of fusion, which keeps motor anomalies latent in a large number of people who would otherwise squint. This lack of fusion is the chief cause of squint and one of the chief hindrances to its removal. In consequence, in many cases the best one can get is a good cosmetic effect, and this often at the expense of diplopia, which may persist to such an extent that the patient will require a restoration of the original squint. In these cases the image in the squinting eye is too peripheral to be more than blurred, and so gives no trouble. As a rule, prisms, fusion, training, etc., all fail to give relief in these cases.

Want of fusion may be due to organic or functional trouble. The defect will lie either in the sensory mechanism, or affect the fibres connecting up the sensory with the motor mechanism. Normally, fusion is an automatic process, due to similar innervation on each side, but when it fails, the two pictures remain, and so double sight. Prisms may be able to blend the two images together, and fusion may take place in the usual way. The worst cases are those where owing to no latitude of fusion, the slightest separation cannot be compensated. There is no marked boundary between normal fusion and various grades of weakness, and the latitude of fusion varies not only in different individuals, but also in the same individual according to the physical and psychical well-being. Defects in the fusion faculty are naturally difficult to recognise in cases of permanent squint, owing to suppression of image, etc. Hence, one can never predict before operation what the result will be with regard to binocular vision. If one could tell when failure would occur, operation could be avoided.

Functional defect of fusion may be studied in slight or latent squint. The clinical picture shows the peculiarity of a so-called functional neurosis and is very frequently associated with the characteristic appearances of hysteria and neurasthenia. It may follow exhausting diseases, local disease of the conjunctiva and cornea, trauma, anæmic states, and sometimes a psychic factor, such as fright, sorrow, etc., may be present. Often, there is only a neuropathic habitus. Treatment of the muscular defect with prismatic and stereoscopic exercises meets with but transitory success. Operative treatment is useless.

A number of cases are quoted to bear out these points, and some are cited which should have been favourable for operative treatment but failed. They were cases of latent squint with fusion present and monocular vision, but subjective symptoms due to increased innervation. Temporary relief was obtained, but return of headache and diplopia with vertical and lateral divergence was the rule. In Case V. no less than twelve muscle operations were performed, the right internal rectus alone being advanced five times. Bielschowsky holds that it was a case of defect in the innervation of the oculo-motor apparatus. Anti-neuralgic remedies met with surprising results. Bengué balsam, for example, applied to the forehead at night, relieved subjective and objective symptoms for several months, although its action then failed, with recurrence of symptoms.

He goes on to say that a squint operation can be of advantage only when the squint is due to a mechanical factor or disproportion in the function of the associated muscles. In the cases given the anatomical position of rest can be quite normal and the temporary squint due to unilateral intermittent excitation of a muscle group. Operation cannot influence this. If the eye is amblyopic the cosmetic effect alone has to be considered. When there is binocular vision at times the condition is aggravated by operation. In these cases he does not consider a neuropathic disposition *sine qua non.*

In some cases the relationship of the headache to the squint may be of nature similar to ophthalmic migraine.

Bielschowsky thinks that in some cases the abnormal motor stimulus may be congenital, for the trouble may exist from earliest childhood. It may vary in intensity, being latent, periodic, or permanent. This latter is least favourable. Absence of the fusion faculty may be an important factor, together with perhaps some pathological condition affecting the oculo-motor centre on one side.

In summing up his observations, Bielschowsky says that divergent and vertical squints, just as some convergent squints, depend not rarely on abnormal innervation of muscles. If the squint is due to an anomaly of the resting position of the eye, then operation should not fail to correct it. The subjective symptoms, such as headache, are the result of unusual compensating innervation due to fusion strain. In some cases squint and diplopia are the prominent symptoms.

No case should be operated on on the strength of one examination.

Frequently repeated examination may show variability of the squint. This inconstancy of the squint angle is an important point in favour of a nervous origin. Another important point is the fact that persons suffering from permanent or periodic squint do not complain of subjective symptoms.

The smaller the squint angle and the more pronounced the lack of relationship between it and the intensity of the subjective symptoms so much the more will one desist from operative interference. In doubtful cases the patient should be warned of the uncertainty of the result and the possibility of failure. R. BEATSON HIRD.

IX.—PATHOLOGY.

(THIRD NOTICE.)

(1) **Vassiliades.—Ossification of the hyaloid membrane.** *Ophthalmic Record*, September, 1910.

(2) **Murray, G. D.—A case of sarcoma of the optic disc.** *Ophthalmology*, October, 1910.

(3) **Fuchs, Ernst.—On rupture of the inner layers of the sclera. (Ueber innere Scleralruptur.)** von Graefe's *Archiv f. Ophthalmologie*, Bd. LXXIX, 1 Heft, April 11, 1911.

(4) **Duclos and Sabot.—Intra-ocular tumour. Association of diffuse melano-sarcoma and perithelioma. (Tumeur intra-oculaire. Association de mélano-sarcome et de périthéliome.)** *Annales d'Oculistique*, mai, 1911.

(5) **Eppenstein, A.—Researches on the presence of elastic fibres in the iris under normal and pathological conditions. (Untersuchungen über den Gehalt der Iris an elastischen Fasern unter normalen und pathologischen Verhältnissen.)** *Zeitschrift für Augenheilkunde*, Juni, 1911.

(6) **Tertsch, Rudolf.—A case of primary fatty degeneration of both corneæ. (Ein Fall von primärer fettiger Degeneration beider Hornhäute.)** *Klin. Monatsbl. f. Augenheilkunde*, Juli, 1911.

(7) **Verhoeff, F. H.—The pathology of superficial punctate keratitis, with remarks on neuropathic keratitis in general, and on a hitherto undescribed lesion of the iris.** *Trans. Amer. Ophth. Society*, Vol. XII, Part III, 1911, p. 791.

(8) **Semple, N. M.—Some questions concerning the method of development and the pathology of the retinitis of Bright's disease.** *Trans. Amer. Ophth. Society*, Vol. XII, Part III, 1911, p. 817.

(9) **Ginsburg, J.—The pathogenesis of cryptophthalmos. (Zur Pathogenese der Kryptophthalmos.)** *Klin. Monatsbl. f. Augenheilkunde*, September, 1911.

(10) **Silva, Rafael.—On 'Drusen' of the choroid and of the retina. (Ueber Drusen der Chorioidea, und der Retina.)** *Klin. Monatsbl. f. Augenheilkunde*, September, 1911.

(1) The patient, a man aged 35 years, had suffered from left phthisis bulbi, the result of purulent ophthalmia, for ten years when the disorganised

eye became painful, and the sound eye became injected and developed ciliary pain. When the disorganised globe was excised by **Vassiliades**, of Beyrout, Syria, it was found that the lens was small and calcified, while behind it was a hard round dense substance, ·36 ctgr. in weight and ·003 in thickness. Its anterior surface was concave ; its posterior surface convex and smooth. The relations to the retina and choroid could be distinguished. The anterior surface showed ridges and grooves, and at centre a thin, thread-like, bony process extended forwards towards the position occupied by the lens, and backwards into the position of the vitreous —thus corresponding to the position of Cloquet's canal, and representing an ossified persistent hyaloid artery. Microscopical examination showed that the hard structure contained all the essential elements of bone.

J. JAMESON EVANS.

(2) **Murray's** patient was a man aged 66 years. When first seen, there had been gradual failure of sight in the right eye for three years and vision was reduced to light perception. There was no pain or outward appearance of disease. The right eye showed one small retinal hæmorrhage, and a pearly-grey spheroidal body in front of and concealing the disc. It looked like a cyst attached to the centre of the disc. Eighteen months later, the eye had become congested and excessively painful. This change seemed to date from an attack of influenza three months before the second visit. Tension was now +2 ; there was hyperæmia and chemosis of the bulbar conjunctiva ; the pupil was irregular, contracted, and fixed, and occupied by an opacity. The eye was enucleated, and covering the disc a growth was found 9 mm. in diameter and 8 mm. thick, and of irregular contour. It proved, on microscopical examination, to be a spindle-celled sarcoma situated between the retina and sclera. A. J. BALLANTYNE.

(3) Incomplete scleral rupture, according to **Fuchs**, of Vienna, begins near the insertion of the ligamentum pectinatum, whereby Schlemm's canal is torn. In slight cases this may be the only damage done. After the absorption of the hæmorrhage from the anterior chamber, no lesion of the iris is seen. But in more serious cases the rupture extends further down within the layers of the sclera, and a clean separation of the inner and outer lamellæ takes place, the cleft being further increased by the action of the ciliary muscle upon the inner layers. Later on, the angle is bridged over by new tissue, and this reunion might proceed so far that the original rupture even became microscopically invisible. But generally the root of the iris is drawn into the gap and then the iris appears somewhat narrowed along the line of rupture ; these cases are more serious, and they sometimes develop secondary glaucoma. Where the rupture has been more extensive, we see, after the swelling has subsided, a bluish-black line near and parallel to the corneal margin, and often more or less extensive scleral ectasia ; the pupil is then much displaced, and the lens is more or less dislocated. R. GRUBER.

(4) **Duclos and Sabot** give a description of the pathological appearances found in a blind eye with glaucoma, cataract, and irido-cyclitis removed from a woman, aged 53 years. The interest of the case centres in a tumour, 24 mm. high with a 9 mm. base, in which the microscopic appearances at the periphery were those of a melanotic sarcoma with fusiform cells, while in the centre the cells were arranged around very marked vascular axes and had the characteristics associated with peritheliomata. R. J. COULTER.

(5) **Eppenstein**, of Berlin, has used the newer methods which differentiate elastic tissue to investigate the whole question of elastic fibres in the iris, a point which up to the present has not been fully worked out He set himself to answer six questions.—To what extent do the iris vessels contain

elastic fibres? Does the posterior limiting membrane (Bruch's membrane) consist, as has been supposed, of elastic tissue? Are there elastic fibres in the essential stroma of the iris? Is there any difference in the elastic content of iris tissue at different ages? Are the conditions under which elastic tissue is met with in the iris influenced by pathological states?

A short account is given of the literature of the subject, and then Eppenstein describes the methods he employed. As a rule, the human iris tissue examined was obtained by iridectomy, but some material came from excised eyes. As a comparison, the irides of rabbits, horses, geese, and hens were examined. The most suitable staining method was found to be a modification of Weigert's elective stain for elastic fibres. Lithium carmine is a useful counterstain. The research gave briefly the following results.—In man the vessel walls always contain elastic fibres, which are generally to be found in their connective tissue sheath. There is no elastic membrane in the posterior layers of the iris. Here is found the dilator muscle of the iris whose smooth fibres possess considerable elasticity. The iris stroma only occasionally contains elastic fibres. Age does not influence the question at all, and the same may be said of pathological states. In the iris of the horse we find the same arrangement of elastic fibres as in the human eye. There are a few elastic fibres in the stroma of the iris in the rabbit, and they are somewhat more numerous in the iris stroma of the goose and hen. T. HARRISON BUTLER.

(6) **Tertsch** describes a rare case of fatty degeneration of both corneæ in an otherwise healthy agricultural labourer, aged 32 years. Clinically, the condition consisted of a symmetrical, roundish, well-defined opacity in the centre of the corneæ, of a saturated, yellow-white colour, and progressive in character. Sight was reduced to the counting of fingers. Slight inflammatory disturbances had occurred repeatedly during the last five years. A superficial layer of the opacity was removed from one eye for microscopical examination. An extensive fatty infiltration of the deeper epithelial stratum and of the corneal tissue proper constituted the chief change. Moreover, the corneal lamellæ were partly swollen, partly shrunk, and split up into fibrillæ. Similar changes were found in Bowman's membrane, which, however, was free from fat granules. The cause of the lesion remained obscure.

C. MARKUS.

(7) This omnibus communication by **Verhoeff**, of Boston, is sumptuously illustrated with fourteen "cuts," arranged on four plates. It commences by describing the history and symptoms of keratitis punctata superficialis, and then passes forward to detail the results of the histological examination of an eyeball from a man of 75 years of age affected with neuropathic keratitis. The eyeball was removed on account of "irido-cyclitis," accompanied by extremely severe neuralgia. Very briefly, the cornea, which was of normal thickness, showed, scattered just beneath its surface, fifteen more or less circular grey spots, 0·3 mm. to 1 mm. in size. None approached closer than 1·5 mm. to the limbus. When examined microscopically, the spots were found to be primarily due to necrosis of a leucocytic infiltration situated immediately below Bowman's membrane. Early specimens showed that each spot was centered, as it were, about a nerve channel in Bowman's membrane. Bowman's membrane (slightly bulged over the spots) was more or less eroded over the grosser accumulations. The erosion was most marked at discrete points corresponding to certain of the nerve channels in the membrane. The covering epithelium was œdematous or thickened, and when detached, as in some of the specimens, that was regarded as an artefact. The corneal lamellæ were merely thrust apart by the infiltration, and never actually

destroyed. A curious focal change was found in the iris, inasmuch as there was proliferation of the vessels about the sphincter and dilator muscles. It is important to note that the corneal infiltrations showed no micro-organisms. The changes, both as affecting the cornea and the iris, are regarded by the author as of neuropathic origin.

The conclusions reached by Verhoeff are as under.—Superficial punctate keratitis (Fuchs) is a form of neuropathic keratitis. The corneal lesions in this condition consist of slowly-formed necrotic leucocytic infiltrates seated beneath Bowman's membrane, and are due to the action of pyogenic diffusible toxic substance arising at nerve terminals. Clinical evidence indicates that the causal nerve lesion is in the ciliary ganglion, and that it is probably due to the elective action of a systemic toxin on certain of the ganglion cells therein. In this affection there sometimes occurs well-marked focal proliferation of the iris blood-vessels. This observation confirms the view that vascular nævi are neuropathic in origin, and suggests that certain angiomata arising later in life may have a similar origin. Disciform keratitis (Fuchs) is essentially of the same nature as superficial punctate keratitis, and is likewise neuropathic in origin. Traumatic relapsing keratitis is due to a state of irritability in the peripheral ganglion cells of the corneal nerves, resulting from intense stimulation of the nerve terminals.

SYDNEY STEPHENSON.

(8) **Semple,** of St. Louis, examined pathologically three eyeballs, which had been affected with albuminuric retinitis for a period that ranged from fifteen to forty-five days. Fat cells were not demonstrable, even in specimens stained with osmic acid. The white masses seen with the ophthalmoscope were found to correspond with masses of fibrin undergoing metamorphosis into hyaline. These were confined chiefly to the outer plexiform layer of the retina. At a later stage of development, these masses yielded the specific staining reactions of hyaline. There were no signs of a fatty degeneration of the supporting fibres of Müller. Semple was unable to find the lipoid bodies described by Lauber and Adamuek. It is, however, possible that the explanation lies in the duration of the retinal disease. Thus, in early cases, nothing might be present but fibrin or hyaline ; fat might be found in cases of long-standing, as by Leber and Krückmann ; and the so-called lipoid bodies may represent an intermediate stage. Semple's specimens fail to substantiate the view, as supposed by Krückmann, that the ophthalmoscopic white spots are due to proliferative and degenerative changes in the supporting or glia tissue.

In all the retinæ examined, Semple found certain changes in the ganglion cells, which were in a state of hyaline degeneration, and which were displaced by exudation and œdema into the nerve fibre layer of the retina, often reaching the internal limiting membrane of that structure. The cells are at first somewhat swollen, and the Nissl bodies lie near the cell membrane, but in more advanced stages they become markedly swollen, lose all the characteristics of the normal ganglion cells, and stain with the various reagents, much as do the masses of hyaline already described as lying mainly in the outer plexiform layer of the retina. These are the same bodies which Heinrich Müller declared were varicosities of the axis cylinder processes, a view also shared by Leber.

Finally, Semple expresses his conviction that the toxin of the patient's blood accounts for the development of the disease in the retina, even before the blood vessels can be proved to show any histological changes. This is directly opposed to the view according to which the retinal disease is dependent upon changes in the blood vessels. It has been demonstrated by

Schiek and others that the retina may be involved in Bright's disease, despite the fact that the choroidal and retinal vessels may be practically normal.

SYDNEY STEPHENSON.

(9) **Ginsburg**, of Kief, gives in this contribution a third and final instalment of his paper. He does not think it possible to explain cryptophthalmos on an inflammatory theory. He holds that it is due to disturbance in the development of the lens, which has not been properly separated from the ectoderm, and has remained outside the secondary optic vesicle. It is referable in its origin to the earliest period of embryonic life, not later than the end of the first month. He believes that the non-development of the lids may also be due to the failure of the ingrowth of the lens. In order to bring cryptophthalmos into line with other developmental defects, he suggests that the amnion may be responsible for the prevention of the proper invagination of the lens.

A. J. BALLANTYNE.

(10) This paper by **Silva**, of Mexico, is based on two cases, in one of which the hyaline growths were found in the choroid alone, while in the other they were present in the retina also. The latter patient was 38 years of age, and had had the eye injured by a knife in childhood. It was removed on account of pain and inflammation. There was calcification in the cornea and lens, the choroid and retina were atrophic, and there was calcification and ossification in the choroid. The retina showed two kinds of bodies. The first were of varying size and form, and formed irregular clumps. They were usually covered with a pigmented capsule, and only the largest of them showed a concentric structure. The second variety, which he calls the retinal '*drusen*' were also of varying size and shape, and irregularly distributed, but almost all in the middle layers of the retina. They were largest and most numerous in the region of the disc. They were free from pigment, had no capsule, and were made up of concentric lamellæ. Their staining reactions were different from those of the choroidal growths. The first variety were obviously derived from the pigment epithelium. For the second he does not accept Murakami's suggestion, namely, that they develop out of leucocytes. He thinks that they are developed from hyaline material deposited in small particles between the cells. They are degeneration products, resulting from the long-continued inflammation of the eye.

A. J. BALLANTYNE.

X.—THE TREATMENT OF LAMELLAR CATARACT.

Kuhnt, H.—On the treatment of congenital lamellar cataract. (Ueber die Behandlung des angeborenen Schichtstares.) *Zeitschrift für Augenheilkunde*, November, 1911.

This paper by **Hermann Kuhnt**, of Bonn, is a most valuable exposition of the best methods of dealing with lamellar cataract, and is one which no ophthalmic surgeon can afford to disregard. It was read to the Congress of Scientists (*Natur Forscher Versammlung*) at Carlsruhe in September, 1911.

The author first reminds his hearers that the permanent results obtained in these cases, even when cases of congenital amblyopia are excluded, leave much to be desired, and are not infrequently exceedingly bad. He bases his observations upon the study of 511 eyes operated upon by himself, and upon the examination of a further 500 or more eyes which had been treated by other surgeons.

One of the most important causes of partial or complete failure is the law laid down by many surgeons to attempt to carry out all the necessary procedures without a general anæsthetic. Kuhnt thinks that every operation of this nature upon children should be performed under general anæsthesia, and we believe that most ophthalmologists in England will agree with him.

The cardinal question, whether we should try to improve the sight by iridectomy or by removal of the lens, has been widely discussed ; iridectomy still finds many adherents, especially among those surgeons who are fully alive to the dangers associated with removal of the lens in these cases.

It is admitted that, under the most favourable circumstances, a visual acuity of more than one-third of the normal cannot be attained by iridectomy, and this is quite insufficient for many trades and professions. For this reason and for others, Kuhnt believes that optical iridectomy is only advisable in very exceptional cases.

The surgeon's aim must be to remove the lens and capsule from the pupillary area in such a way that :—

(1) The pupil shall remain intact.

(2) Any inflammation, permanent distortion, or adhesions of the iris shall be avoided.

(3) Every precaution shall be taken to avoid any future diminution of the acuity obtained by the operation.

The first two postulates can, as everyone knows, be satisfied only when the capsulotomy is performed with the greatest care and skill.

We have no possible means of guessing how the lens will react when the aqueous obtains access to it—whether the solution of the lens will proceed without any reaction, or whether there will be a rapid swelling, associated with inflammation and perhaps with glaucoma.

It is therefore necessary first to test the power the pupil has of dilating by using a mydriatic. If the mydriasis is insufficient, as occurs in 2 to 5 per cent. of the cases, then either phacolysis must be abandoned, or else an iridectomy upwards must precede the discission.

The capsulotomy must be made subconjunctivally ; it must be central and vertical, small and superficial ; and it need not exceed 2½-3 millimetres in length.

A second more extensive opening can be made when it is seen that no rapid swelling of the lens is going to take place. This primary test discission is only intended to inform the operator as to the kind of reaction he is to expect.

Kuhnt is strongly opposed to primary linear extraction of lamellar cataract. He considers that the risks are entirely out of proportion to the advantages of the operation.

The damage caused by a rapidly swelling lens is partly due to purely mechanical causes, but there is evidence that there is also a toxic effect. The author quotes a case which illustrates this action.

If the test discission be not followed by symptoms of irritation, several methods of continuing the treatment are at our disposal. We can quietly wait for the processes of absorption to continue undisturbed, or we can accelerate them by a second more drastic discission, which, also subconjunctival, would naturally be made horizontally. Or as soon as the opacity of the lens has become almost complete, we can proceed to linear extraction. If the nucleus be extruded into the anterior chamber and symptoms of irritation supervene, it must be extracted with the greatest care.

Every endeavour must be taken to provide against the development of an after-cataract. It may be accepted, as a general rule, that *the younger the individual the more rapidly and completely are thickening and clouding of the capsule liable to occur after removal of the lens substance.*

Again, as much of the capsule as possible should be removed to prevent these undesirable changes. To avoid nystagmus, and to obtain good acuity, we are obliged to operate early in life, and therefore it should be a rule to extract as much of the anterior capsule as possible, to remove as much of the lens substance as we can, and, finally, to remove the posterior capsule from the pupillary area at the earliest opportunity.

If the test discission be followed by a steadily increasing opacity without any marked swelling of the lens substance, we can perform linear extraction after about a week without the slightest danger. An incision should be made in the limbus and the aqueous allowed to flow out slowly, then the capsule should be removed with capsule forceps as extensively as possible, and, finally, the lens substance should be massaged out with Daviel's spoon. The final evacuation can be completed by irrigation of the capsular sac.

Kuhnt describes and illustrates four varieties of capsule forceps which he employs to make his capsulectomy as complete as possible. By floating the capsule in water it is easy to determine to what extent it has been removed.

It is often useful to combine linear extraction with a small peripheral iridectomy by Pflüger's method. The iris is pierced with a hook one millimetre from its ciliary attachment, stretched centripetally, and separated from its ciliary attachment with a small discission knife. (Personally we should call this an *iridotomy*.—T. H. B.)

To obtain a permanent result, it is necessary, finally, to remove the posterior capsule from the pupillary area. The method Kuhnt adopts is an early subconjunctival discission. He performs the operation with either one or two knives. It is essential in either case: that we obtain a fissure 8-9 mm. long; that no pressure be exerted upon the vitreous; and that the knives do not penetrate deeply into the vitreous. Regarding this last postulate we may notice that Ziegler in demonstrating his operation of V-shaped discission at Oxford (July, 1911) allowed his knife to enter the vitreous deeply, and apparently attached no importance to disturbing this structure. Kuhnt makes a horizontal incision in the single knife operation. The subconjunctival two knife operation is much more difficult, but always yields a large opening in the capsule, and eliminates all danger of traction upon the ciliary body. The knives are entered through the sclera below the cornea at spots distant 3-4 mm. from each other, and allowed to enter the capsule centrally 1 mm. below its horizontal diameter, back to back. They are then caused to cut away from each other, forming a long gaping aperture. The two knives are now used like scissors, one is passed 3-4 mm. into the vitreous behind the capsule and the other placed in front, so that the two cutting edges face each other. Then a vertical cut is made. The result is a T-shaped incision in the capsule which forms a large central pupil in the capsule. If this early discission be not carried out, the capsule becomes so thick and rigid that these operations are no longer sufficient. The correct procedure at this stage is partial or total extraction of the capsule.

Sometimes, a modification of the two-knife method suffices. Two horizontal incisions are made parallel to each other and 4 mm. apart. The central band is now divided by the knives used scissor-wise. In other cases it is possible to seize the capsule with forceps and gently to drag it out through a small keratome incision. But when the capsule is obviously thick and tough, total extraction is necessary. If the pupil dilate fully, a zonulotomy is made (see *Zeitschrift für Augenheilkunde*, Bd. XIX, abstracted in THE OPHTHALMOSCOPE, Vol. VI, p. 460). Then, a small incision is made, and the capsule removed with a sharp hook. If the pupil dilate insufficiently, the best we can do is to the seize the capsule with forceps and gently drag it out partially or completely. In some cases the use of de Wecker's scissors is necessary to divide the capsule; this procedure must be adopted when iridocyclitis has been present, and a dense sheath of membrane has formed. If the vitreous be fluid, we cannot adopt this method, but are obliged to cut through iris and membrane with Graefe's knife. The knife is entered through the temporal end of the horizontal meridian, passed into the vitreous, a counter-puncture is made through the iris nasally, and a flap incision cut for about 4 mm. Unfortunately, Kuhnt does not tell us how to determine whether the vitreous is fluid or not, a most important detail! T. HARRISON BUTLER.

XI.—OPTICAL MISCELLANEA.

(1) Oppenheimer, E. H.—Optical memorandum cards. (Optische Merkzettel.) *Wochenschrift f. Therapie u. Hygiene des Auges*, 6 Januar, 1910.

(2) Oppenheimer, E. H.—Bi-focal glasses. *Wochenschrift f. Therapie u. Hygiene des Auges*, 18 August, 1910.

(3) Dufour, Marcel.—On recent progress in ocular dioptrics. (Sur les récents progrès de la dioptrique oculaire.) *Ann. d'Oculistique*, septembre, 1910.

(4) Farnarier, F.—On the notation of prismatic glasses in prescriptions for spectacles. *L'Ophtalmologie Provinciale*, novembre, 1910.

(5) Green, John.—Coquille protective spectacles. *American Journal of Ophthalmology*, November, 1910.

(6) Oppenheimer, E. H.—Test case observations. (Brillenkasten-Betrachungen.) *Wochenschrift f. Therapie u. Hygiene des Auges*, Oktober 6, 1910.

(7) Oppenheimer, E. H.—Finger pince-nez. (Fingerkneifer.) *Wochenschrift f. Therapie u. Hygiene des Auges*, Dezember, 1910.

(8) Polack and Chevallereau, Jacques.—On want of parallelism between the principal meridians of corneal astigmatism and those of subjective astigmatism. (Défaut de parallélisme entre les méridiens principaux de l'astigmatisme cornéen et ceux de l'astigmatisme subjectif.) *Ann. d'Oculistique*, décembre, 1910.

(9) Campos.—On the relation between ocular deviations and the prismatic action of lenses. (Rapports entre les déviations oculaires et l'effet prismatique des lentilles.) *Ann. d'Oculistique*, octobre, 1910, et janvier, 1911.

(10) Mayer, E.—On the notation of sphero-cylindrical lenses. *La Clinique Ophtalmologique*, 10 janvier, 1911.

(11) Scott, Kenneth.—Telescope eyeglasses. *Ophthalmology*, April, 1911.

(12) Morrell, Reginald A.—The prescription of glasses. *British Medical Journal*, May 13th, 1911.

(13) Dufour, M.—Correcting glasses regarded as optical instruments. (Les verres correcteurs envisagées comme instruments d'optique.) *Ann. d'Oculistique*, août, 1911.

(14) **Oppenheimer, E. H.—Three lens spectacles. (Eine Dreigläserbrille.)** *Wochenschrift f. Therapie u. Hygiene des Auges*, 24 August, 1911.

(15) **Campos.—What is to be understood by the term metre angle? (Que faut-il entendre par angle métrique?)** *Revue Générale d'Ophtalmologie*, 31 août, 1911.

(1) **Oppenheimer**, of Berlin, recommends to oculists the employment of memorandum cards similar to dietetic and other cards given to patients by some doctors when details in treatment may be forgotten. They are also useful for saving time in explanations, prevention of omissions, and putting in black and white what might give rise to misunderstandings. Suggested titles are: What do spectacles aim at and accomplish? When are glasses to be worn? Do children require glasses? etc. The author does not mention warning notices advised by the Ophthalmological Society of the U.K. regarding ophthalmia neonatorum, and issued now by various bodies.

W. B. INGLIS POLLOCK.

(2) In this short reply to the paper by H. Dor, of Lyons, which was translated in THE OPHTHALMOSCOPE, Vol. VIII, 1910, p. 719, **Oppenheimer,** of Berlin, states that few American opticians make these lenses since the cemented circle may slip, and optical disadvantages may be urged against them. In the latest form of bi-focal glasses, such as the "Kryptok" and "Unibifocal," the reading segment does not take up the entire lower circumference of the lenses. The folding reading segments are scarcely worth discussion.

W. B. INGLIS POLLOCK.

(4) The suggestion of **Farnarier** is, if we understand aright, that prisms in the trial case should be marked by a line parallel to the apex, *i.e.*, at right angles to the base-apex line. ERNEST THOMSON.

(5) **Green's** article is mathematical. It does not lend itself to abstract. It is an addition to an article published in the same journal in November, 1909. ERNEST THOMSON.

(6 and 7) In these two desultory papers **Oppenheimer,** of Berlin, contributes some notes on recent novelties.—For test cases he considers that eighths of dioptres are unnecessary, a point on which there may be some difference of opinion on this side of the ocean. Plain lenses and −24 D. and −28 D. are advised for obtaining visual acuity. Bi-focal and plano-spheres and plano-cylinders, if present in the more expensive cases, might be useful in giving a nearer approximation to the lenses as they leave the optician's hands. A distinction between half and quarter dioptres is also recommended. The second article contains a translation from an optical catalogue on the new form of pince-nez with small levers for the fingers, so that it can be placed on the face without touching the glass. The author considers that the spectacle is better suited for the "broad German face than a pince-nez, which may be more simply adapted to the narrow English-American type of face."

W. B. INGLIS POLLOCK.

(8) **Polack and Jacques Chevallereau** have found that in 36 per cent. of a series of 2,005 cases the axis of the corneal astigmatism as shown by the ophthalmometer differed from the axis of the cylinder chosen subjectively, and that, contrary to the opinion of Tscherning, such differences occurred in cases in which the astigmatism was high as well as in those in which it was slight. The amounts of the differences varied from 5° to 45°. R. J. COULTER.

(10) **Mayer's** proposal had better be given in his own words:—

"Of the two principal meridians of an astigmatic lens there is always one which is placed upwards and to the nasal side, or downwards and to the temporal side. It is this meridian the inclination of which is to be indicated by an angle. It is, then, sufficient to indicate the power which the lens is to have in this meridian, and that which it is to have in the meridian at right angles, in order completely to specify the lens from the optical point of view. In order to distinguish these two meridians, it is only necessary to place the second power underneath the first :

$$\text{Example :}-25^\circ\begin{cases}+\,2\text{ D. sph.}\\-0.75\text{ D. sph.}\end{cases}$$

" This notification would mean that in the nasal quarter circle, above the horizontal, the meridian at 25° would have a power of +2 D., and that the meridian at right angles would have a power of —.75 D."

ERNEST THOMSON.

(11) Telescope lenses are used for the higher forms of myopia, and have the advantage that they give a wider field, better definition at the periphery, and less distortion than ordinary lenses. The disadvantage hitherto attaching to telescope eyeglasses is their heaviness and clumsy appearance. The form suggested by **Scott**, of London, and made by Messrs. Reiner and Keeler, do not differ in outward appearance from ordinary spectacles. The front and back lenses are in contact by their edges only, and enclose an air space between. A. J. BALLANTYNE.

(12) **Morrell,** of London, points out that although in some cases the eye may be regarded as an imperfect optical instrument capable of improvement by mechanical means, yet in others it must be looked upon " as an organ which has as great a claim to be treated on rational lines as any other."

SYDNEY STEPHENSON.

(13) **Dufour's** article is a *résumé* of the most practical new points in the article on spectacles as optical instruments written for the second edition of the Graefe-Saemisch *Handbuch der gesammten Augenheilkunde* by Dr. Moritz von Rohr, a scientific collaborator of the firm of Zeiss. Particular attention is paid to Gullstrand's aspherical lenses for correcting the astigmatism of oblique rays in aphakic eyes. R. J. COULTER.

(14) **Oppenheimer,** of Berlin, describes new spectacles with three lenses, in which the third lens is attached by a hinge to the centre of the bridge, and can be rotated before either eye. A catch at each hinge keeps the third lens before the eye, in front of which it may be turned. The sample has too large a distance between the lenses, too great a distance for accuracy. The new glasses are advised in cases where strong lenses are at present placed in reversible glasses, *e.g.*, in cataract cases. The author considers that accurate centring cannot be obtained with reversibles in these cases.

The new spectacles are suitable whenever a third lens is placed before one eye, and may be lost or damaged when laid down. In place of the third lens an opaque or non-transparent glass may be used in the case where one eye is in focus for distance and the other for near, either requiring a lens for the purpose, and diplopia supervening when ordinary spectacles are used. An illustration accompanies the original paper, but is scarcely necessary.

W. B. INGLIS POLLOCK.

(15) The metric angle, according to Nagel, is defined by Landolt as " the angle of convergence necessary to give binocularly an object situated on the median line at 1 metre from each eye." In France, the idea of the metric angle constantly tends to deviate from its original meaning ; for the distance of 1 metre is usually reckoned from the middle of the base line. In this paper **Campos,** of Cairo, discusses these two conceptions of the angle.

ERNEST THOMSON.

XII.—SCOPOMORPHIN ANÆSTHESIA.

Agricola, B.—The technique and applicability of partial narcosis and mixed narcosis by means of scopomorphin in eye operations. (Methodik und Anwendungsgebiet des Skopomorphin-Dämmerschlafes und der Skopomorphin-Mischnarkose bei augenärztlichen Operationen.) *Klin. Monatsbl. f. Augenheilk.*, Februar, 1912.

Agricola, of Hanover, points out that it is desirable to distinguish between (1) complete narcosis produced by scopomorphin alone, (2) partial narcosis brought about in the same way, the dose being such that perception and memory are suspended, but sensibility is merely dulled, so that the narcosis must be supplemented by local anæsthesia, and (3) mixed narcosis, in which the injection of scopomorphin is followed up by the administration of chloroform, ether, or some mixture.

These anæsthetic methods are designed to obviate the undoubted risks to life which attach to even short administrations of chloroform or ether. Full scopomorphin narcosis is itself not without danger, and should only exceptionally be used in ophthalmology. Partial scopomorphin narcosis is, in the author's opinion, the method of choice for patients who are apprehensive about their operation, or for slight operations which do not demand a general anæsthetic. It is not a substitute for general anæsthesia, and is not suited for operations requiring deep sleep. In such cases mixed narcosis is to be employed, its advantages being freedom from danger, undisturbed sleep, and the maximum of comfort for the patient. Scopolamin and morphin are antagonists as regards the respiration and the pupil, and the combination, by reducing the secretions of the mucous membranes, limits the risks of post-operative pneumonia. Agricola recommends that the amounts of the drugs administered should not exceed 0·0006 gramme of scopolamin and 0·015 gramme of morphin. This should be given in two doses before operation, and as general anæsthetic he recommends an ether, chloroform, or ether sequence. While the object of the article is to advocate the use of scopomorphin, there is no attempt to conceal the drawbacks of the method, which would appear to be numerous. It should not be employed in children, as it may cause excitement instead of narcosis, or in old people, in whom the narcotic effect may easily be overdone. There may be some danger of exciting glaucoma by dilatation of the pupil, if scopomorphin is used to produce full narcosis, but if the dose is kept within the limits named above, pupillary dilatation of a dangerous degree does not occur. Respiration is much reduced in frequency, to ten per minute or even slower, and in weak individuals asphyxia has been observed. In some young and strong men, and in certain nervous people, it causes excitement. In other cases the narcosis was normal but there was great excitement on waking. The sleep which succeeds the operation may be so deep that the patient requires to be watched for hours to prevent the tongue from interfering with respiration. Disagreeable after effects, such as sickness, vomiting, and dryness of the throat, are not unknown. The patients are particularly sensitive to noise, so that the ears should be stopped with wool, and every means taken to ensure quiet surroundings in the theatre and elsewhere. Lastly, it is recommended in some cases to give bromides for a week, and veronal the night before operation. A. J. BALLANTYNE.

XIII.—MYOPIA.

(1) **Meyerhof, M.**—Myopia in illiterates, in astigmatism and corneal opacities in Egypt. (Ueber Kurzsichtigkeit bei Analphabeten, bei Astigmatismus und Trübungen der Hornhaut in Aegypten.) *Centralbl. f. prak. Augenheilk.*, July, 1910.

(2) **Dufour, Auguste.**—School myopia. (La Myopie Scolaire.) *Revue Internationale d'Hygiène et de Thérapeutique Oculaires*, novembre-décembre, 1910.

(3) **Siebenlist, W.**—The myopia question. (Zur Myopiefrage.) *Zeitsschrift für Augenheilkunde*, Mai, 1911.

(4) **Hesse, R.**—Has the operative treatment of high-grade myopia any justification? (Hat die operative Therapie der hochgradigen Myopie eine Berechigung.) *Zeitschrift für Augenheilkunde*, Mai, 1911.

(5) **Butler, T. H.**—A bright-green macular hole caused by myopia. (Eine durch Myopie verursachte hellgrüngefärbte Lochbildung der Maculagegend.) *Zeitschrift für Augenheilkunde*, August, 1911.

(6) **Bailliart, P.**—The total correction of myopia. (La correction totale de la myopie.) *Bull. Gén. de Thérapeutique*, 30 octobre, 1911.

(7) **Bogatsch, G.**—Heredity in Myopia. (Vererbung bei Myopie). *Klin. Monatsbl. f. Augenheilk.*, Oktober, 1911.

(8) **MacNab, Angus.**—Myopia. *The Polyclinic*, August, 1911.

(9) **Dianoux.**—Myopia and myotics. (Myopie et Myotiques.) *La Clinique Ophtalmologique*, 10 fevrier, 1912.

(10) **Bates, W. H.**—On functional myopia. (De la Myopie fonctionelle.) *La Clinique Ophtalmologique*, 10 avril, 1912.

(1) **Meyerhof**, in the course of some two years' residence in Egypt, has had opportunities of examining a large number of natives, most of whom are illiterate; and he has found among them a very large percentage of myopia. Since these people do very little or no near work, Meyerhof seeks for the cause of this myopia in the great frequency of corneal opacities, the result of ophthalmia neonatorum and of the almost universally prevalent trachoma. These opacities interfere with vision, they cause irregular astigmatism and therefore necessitate a greater effort in order to see anything clearly, and the result is myopia. The paper itself has many statistical tables which are of considerable interest. A. LEVY.

(2) **Dufour's** article upon school myopia is of the nature of a review directed to the fuller appreciation of the risks of defective school hygiene as regards the development of myopia.

(3) This is a statistical paper by **Siebenlist** (Greifswald), a record of the examination of cases of myopia treated at the University Eye Clinic at Greifswald between 1900 and 1910. Among 26,419 eye patients there were 3,527 myopes of over 1D., a percentage of 10·4. Of the male patients, 13 per cent. were myopic; of the female, 9·3 per cent. In 1·8 per cent. of all myopes there was anisometropia exceeding 2D. In 60·2 per cent. of these the right eye was the more short-sighted. The number of myopes is inversely proportional to the age of the patients. Among low-grade myopes there is a preponderance of males, above 7D. the reverse is true. That is to say, a woman has a greater tendency to suffer from pernicious myopia. There is an immense preponderance of medium grade myopia among the

classes which perform close work, but above 10D, the conditions are reversed; there is an excess of women and of persons who do not follow close work, farm labourers, and such persons. Complications increase in frequency concurrently with the increase in myopia, and are more common in the female sex—for example, choroiditis is exactly twice as frequent among females than among males All complications are commoner among those who lead an outdoor life. Loss of visual acuity increases *pari passu* with the degree of myopia, but is more marked in those who do not do close work.

The paper discusses the vexed question as to whether or not there are two varieties of myopia, "school myopia" and "essential pernicious myopia," but leaves it rather an open question. T. HARRISON BUTLER.

(4) **Hesse**, (Gratz).—This question even to-day has received no definite answer. At present the general tendency is against the operation, because it is believed that detachment of the retina is more common among myopes who have been operated upon than among those who have not. Hesse has taken the trouble to tabulate and to trace all the patients who have had their lenses removed to relieve high myopia at the eye clinic at Gratz University since 1891. They number 49, and 67 eyes were treated. The failures which followed immediately after the operation numbered six.—Only in one case did the retina become detached; one had amblyopia ex anopsia; one was infected; and three had dense capular membranes. In ten cases the final result was bad owing to the following causes:—optic atrophy, one case; detached retina, two; failure after accident, one; operative infection, one; iridocyclitis, cause unknown, one; amblyopia ex anopsia, one; after-cataract, three.

Some of the bad results are easily explained, as the author shews, and infection should not occur at the present time when aseptic *technique* is better developed.

The author concludes that an examination of these cases affords no support to the view that extraction of the lens in cases of high myopia is causally associated with ablatio retinæ. He prefers discission and curette extraction to linear extraction, which is, in his opinion, a more formidable procedure. Most surgeons will agree with this opinion.

The results obtained at Gratz, then, answer the question put at the head of the paper in the affimrative. The visual acuity was, on the average, increased 50 per cent., and detachment only occurred twice.

The cases are carefully tabulated, so that it is easy to follow them. The paper, which is founded upon fact and not upon theory, is well worthy of study. T. HARRISON BUTLER.

(5) This case by **Butler**, of Leamington, has already been fully described in THE OPHTHALMOSCOPE (January, 1909). This paper is, however, accompanied by a somewhat inferior reproduction of the coloured drawing of the two fundi. T. HARRISON BUTLER.

(6) To the modern rule of full correction of cases of myopia **Bailliart**, of Paris, makes the following exceptions.—(1) After the age of 35 years full correction is not tolerated for near work. (2) Considerable caution should be exercised in patients affected with lesions of the deeper membranes of the eye, as well as with posterior staphyloma. (3) In adult myopia of more than 10 D. or 12 D. the full correction is seldom tolerated, even for distant vision. In Bailliart's opinion, the total correction of myopia for distance and for near work is particularly indicated in myopia of slight or moderate amount, especially in children or adolescents. SYDNEY STEPHENSON.

(7) **Bogatsch**, of Breslau, gives a family tree comprising a man and wife, six children, and thirty grandchildren. The original pair were cousins, but had normal eyes. Of the other thirty-six individuals, eleven were affected

with myopia, or detachment of the retina, or both. Four had bilateral, and three unilateral, detachment of the retina, with myopia in the other eye; four had high myopia in both eyes. In all cases the myopia had commenced early in life. One female of the second generation had married a cousin on her mother's side, and her family was the most strongly affected, five out of her seven children being involved. The relative importance of consanguinity and heredity is very briefly discussed.

A. J. BALLANTYNE.

(8) This interesting and forcible short article on myopia (or as we should have preferred to entitle it "School Myopia," since myopia in the adult is not here seriously in question) by **MacNab,** of London, deals with the causation and proper school treatment of the disease. The accommodation theory and its corollary, the under-correction of the myopia, receive their quietus, and the convergence theory receives the whole-hearted support of the author, who goes so far as to state that a slight over-correction is better than an under-correction.

ERNEST THOMSON.

(9) The suggestive article by **Dianoux,** of Nantes, deserves to be widely read He has found that in commencing myopia in young people whose scleral tissues have not yet lost their elasticity, the progress of the myopia can be stopped by the use of myotics associated with the full correction of the myopia. Details should be sought in the original and in the thesis of Battereau, a pupil of Dianoux (1908, *Prophylaxie de la myopie,* Michalon, Paris). The author explains his observed facts in the following way.—It is well known that the irido-choroidal coat is rich in elastic fibres, and especially in smooth muscular fibres. Nicati has well shewn the contractile power of this regulating apparatus of the intra-ocular tension. Myotics produce contraction or spasm of these elements. Now, since this tunic or girdle (*sangle*) surrounds the whole vitreous body, the latter is clasped or squeezed by it, as a sponge would be squeezed between the two hands. A portion of the liquid part of the vitreous is driven through the pupil into the anterior chamber, whence, owing to the smoothing out (*déplissement*) of the iris, and the increase which takes place in the filtration angle, it escapes with the greatest ease. It is a true internal massage. Such a view, the author explains, is consistent with the fact that the treatment with myotics is only of much use in the young, in whom the sclera retains its elasticity, so that it can shrink to its former dimensions as the result of repeated and long continued contraction of the iris and choroid, and in whom filtration is at its maximum. The good effects of total correction of the myopia can be explained in the same way, since by this the musculo-elastic mechanism of the choroid is put in action.

ERNEST THOMSON.

(10) The reviewer finds himself not quite able to follow the arguments of **Bates** (New York) in support of his views, and will therefore not attempt to translate them from the French. These arguments are brought forward in support of contentions, some of which occur in the following sentences:—"In general one has regarded atropine as an infallible adjuvant in the diagnosis of myopia. If, after repeated instillations for several days, the myopia persists, one considers this fact as proof that elongation of the eye has taken place. My observations during twenty-five years of practice have convinced me that one cannot trust atropine for the differentiation between functional and true myopia. That the muscles of the eye are capable of changing the form of this organ one can hardly doubt. . . . . All individuals, even children and old people, can voluntarily make themselves myopic by an effort in looking at distant objects. One can make oneself myopic in this way even in the case where the ciliary muscle is paralysed by atropine and

also in aphakia after cataract extraction. . . . . Having established the fact that muscular contraction is the direct cause of functional myopia we have to establish the conditions in which the focus is displaced. According to general opinion myopia is contracted by the habit of looking too closely at objects in a bad light. By a long investigation of this subject with many experiments I have arrived at the conclusion that this claim is erroneous. Myopia results from efforts made to distinguish distant objects." ERNEST THOMSON.

XIV.—REMEDIES.

(1) Dufaure.—The essences in ophthalmology. (Les essences en ophtalmologie.) *La Clinique Ophtalmologique*, septembre, 1911.

(2) Jacovidès.—Medical and surgical treatment of trachoma. (Traitement médicale et chirurgicale de trachome.) *La Clinique Ophtalmologique*, septembre, 1911.

(3) Cavara.—A contribution on the use of radium in the treatment of epithelioma of the eyelids. (Contribution à l'emploi du radium dans l'épithélioma des paupières.) *Ann. d'Oculistique*, octobre, 1911.

(4) Dor, Louis.—Tuberculin therapy of ocular tuberculosis. (Tuberculinothérapie de la tuberculose oculaire.) *La Clinique Ophtalmologique*, 10 février, 1912.

(5) Wiegmann, E.—Salvarsan therapy in syphilitic eye diseases, with notes on some good results in cases of oculomotor paralysis. (Zur Salvarsantherapie bei Augenkrankheiten nebst Mitteilung einiger günstig beeinflusster Fälle von Augenmuskellähmungen.) *Klin. Monastbl. f. Augenheilk.*, Februar, 1912.

(6) McIntosh, James; Fildes, Paul; and Dearden, H.—The causation and prevention of certain toxic symptoms following the administration of Salvarsan. (From the Bacteriological Laboratory of the London Hospital.) *Lancet*, March 9th, 1912.

(7) Dor, L.—The replacement of the vitreous by saline. (Le remplacement du corps vitré par l'eau salée.) *La Clinique Ophtalmologique*, 10 mars, 1912.

(8) Darier, A.—The administration of antistreptococcic serum by the mouth and by local application. The conclusive experiences of Ruppel. (Sérotherapie antistreptococcique par voie buccale et en application locales. Expériences concluantes de Ruppel.) *La Clinique Ophtalmologique*, 10 mars, 1912.

(9) Danis, Marcel.—Treatment of tobacco amblyopia by Lecithine. (Traitement de l'amblyopie nicotinique par la lécithine.) *La Clinique Ophtalmologique*, 10 mars, 1912.

(10) van Lint.—Pre-operative treatment of a tuberculous dacryocystitis by means of bismuth paste. (Traitement préoperatoire, à la pâte au bismuth, d'une dacryocystite tuberculeuse.) *La Clinique Ophtalmologique*, 10 mars, 1912.

(11) **Kaz, R.—Eserine and atropine in diseases of the cornea. (Eserin und Atropin bei Erkrankungen der Hornhaut.)** *Klin. Monatsbl. f. Augenheilk.*, März, 1912.

(12) **Löwenstein, Ernst.—On ambulatory tuberculin treatment. (Ueber die ambulante Tuberkulinbehandlung.)** *Die Heilkunde*, 1912, No. 7.

(13) **Smith, Lt.-Col. Henry.—The treatment of the early stages of senile cataract.** *Lancet*, April 20th, 1912.

(14) **Colombo, Jan Luigi.—Gonococcal serum in the treatment of gonorrhœal conjunctivitis of the newborn, and its mode of action. (Das Gonokokkenserum in der Therapie der Gonoblennorrhöe der Bindehaut bei Neugeborenen und seine Wirkungsweise.)** *Klin. Monatsbl. f. Augenheilk.*, April, 1912.

(1) **Dufaure**, of Tunis, has been much pleased with the result of his treatment of conjunctivitis, especially trachoma, with vegetable essences.

(3) **Cavara** gives *résumés* of the histories of fifteen cases of epithelioma of the eyelids treated by applications of radium in the electrotherapeutic department of Dr. Labbé, at the Hôpital de la Charité, Paris. Of these, eleven were under his own care in conjunction with Dr. Masotti, and the remaining seven, which were under Dr. Masotti alone, are included, as they were of older date, and are therefore valuable as affording evidence as to the permanence of the cures. Except in one case, in which a tube of radium was introduced into the tissues, the applications were made with radium fixed on a metallic surface by means of a special varnish. In most of the cases the method employed was that of total radiation, and the *séances* were long, varying from one to three hours. In some instances, however, a series of shorter *séances*, not of less than half an hour's duration, was given on successive or alternate days. The apparatus, surrounded by a thin layer of gutta-percha tissue, was applied directly to the affected area. Diseased areas in the upper part of the lower lid or in the lower lid were pulled as far as possible from the eyeball, but when the lesion was situated near the margin of the upper lid, the latter was everted, and the apparatus was placed on the pocket so formed with its inactive side towards the eyeball. In a few cases of small superficial epitheliomata short *séances*, varying from five to thirty minutes, were given when no precautions were necessary to avoid risk to the eye. In some cases in which it was desired to influence deep layers of the tumour without causing a superficial reaction, the method of demi-filtration was employed, *i.e.*, the X-rays and the soft β rays were intercepted by means of a thin plate of platinum or lead leaving the hard β rays and the γ rays to act. Finally, the simultaneous use of several forms of apparatus is indicated when it is desired to act on lesions situated at the level of the orbital margins. To obtain the best results by bringing the apparatus into immediate contact with the lesion, crusts were cleaned away by a moist dressing and sebaceous material removed by scrubbing with alcohol or ether, and the apparatus chosen was wrapped in gutta percha tissue and fixed against the diseased tissue by strapping or a bandage. If the diseased area was smaller than the apparatus, the superfluous part of the latter was screened by a piece of sheet lead. Among the tumours treated there were papillomatous, cauliflower, and warty epitheliomata belonging to the spino-cellular group and springing from the Malpighian layer, and superficial cicatricial epithelioma, pearl epithelioma, and rodent ulcer belonging to the baso-cellular group and springing from the basal layer. Of these the baso-cellular growths reacted more easily to radium, while of the spino-cellular

group, the cauliflower epitheliomata were the easiest to cure. Apparatus rich in β and γ rays as compared with α rays were the ones most commonly used, recourse being had to those rich in α rays when a superficial action was desired, as in baso-cellular epitheliomata. The application is followed by a painless reaction which may commence within twenty-four hours, and reaches its maximum in about fifteen days. This is proportional to the length of the application and the strength of the apparatus. It usually consists of erythema with abundant serous exudation which form crusts of impetiginous appearance, sometimes moist and at other times dry. In the former a secondary infection may take place, which should be treated on general principles. The crusts are shed from time to time, being replaced by smaller ones until at the end of one or two months, the last small ones disappear, leaving a soft fine white cicatrix which glides over the subjacent tissues and shows no tendency to contraction.

Sections of specimens removed at intervals during the healing process showed that the neoplastic cells both in the bands and nodes became swollen, underwent colloid or mucoid degeneration, and finally disappeared, while at the same time there was proliferation of the inter-epithelial connective tissue, which produced bands formed of embryonic connective tissue cells, which surrounded and stifled the masses of neoplastic cells. At the end of the treatment, the microscopic field was occupied by a delicate connective tissue still rich in nuclei and containing a few isolated cancer cells in process of dissolution. Some deep recurrences in cases of epithelioma of the lids have been observed among the older cases treated by Dr. Masotti, and in these very long applications of filtered emanations rich in γ rays have given good results, as they produce an effect on the deeper tissues with little or no superficial reaction. Good results were obtained in some cases by scraping the diseased surface before applying the radium. The cases treated were:—1. Basocellular epitheliomata six cases, six cured, one of five years and one of three years duration. 2. Spino-cellular epitheliomata four cases, four cured, one of 2½ years and one of six months duration. 3. Epitheliomata in which no microscopic examination was made, six cases, three cures, and three improvements. In two of the unsuccessful cases the orbit was infiltrated, while in the third the patient failed to return after the third application. R. J. COULTER.

(4) **Louis Dor**, of Lyon, whose most interesting article on this subject in *La Clinique Ophtalmologique* for 10th April, 1909, was translated in THE OPHTHALMOSCOPE of that year, now contributes a short article summarising his opinions at the present day.

Tuberculin remains, after all, our best means of treating tuberculous disease as it occurs in the eye, an organ which is specially suitable for the observation of all that goes on as the result of our intervention. When properly managed, when only minute doses are employed, it interferes in no way with the general health. (It must be noted, however, that if there is any kind of pulmonary affection Dor does not use tuberculin.) It is true that relapses may occur months after an apparent cure. Such cases must be treated anew with tuberculin, but their occurrence makes it impossible in the meantime to give useful statistics.

While tubercle of the iris is specially amenable to this treatment, that of the retina, of which condition Dor has seen three cases, is much more rebellious. Tuberculosis of the cornea occurs clinically in many forms. There are mild and also severe cases which cure easily. The form which has appeared to be most favourably influenced is " Descemetitis with iridic uveitis." Then follows interstitial keratitis, when this is purely bacillary. Phlyctenular conditions of the conjunctiva and cornea are sharply influenced, but, on the other hand, relapses are apt to follow the cessation of the treatment.

A remarkable point is the extreme difficulty of influencing tuberculous disease of the conjunctiva and of the lacrymal sac. Open tubercle seems to be more difficult than the closed form. This is perhaps due to secondary infections, but in any case the observation is to be considered in relation to the fact that pulmonary, laryngeal, and cutaneous tuberculosis is more difficult to cure than the surgical varieties.

Next as to the methods employed. Dor always adopts hypodermic injection. He has abandoned the tuberculin of Beranek. He gave a trial to Calmette's tuberculin, but abandoned it on account of its too great toxicity in the non-febrile tuberculous diseases of the eye. For a year past he has been trying the Russian preparation "Endotine." It is exceptionally harmless and merits trial. It has the advantage that its administration is never followed by a rise of temperature or by malaise. Endotine is a residual tuberculin obtained after removal by means of ether, chloroform, xylol, alcohol, etc., of all the reputedly active principles from tubercle cultures. But the tuberculin which is in most favour is the bacillary emulsion (B E.) of Meister, Lucius, and Bruning, and it is this tuberculin which Dor considers best on the whole. ERNEST THOMSON.

(5) Taking up the review of the literature where it was left by Stuelp (*Klin. Monatsbl.*, März, 1911), **Wiegmann**, of Hildesheim, makes a fresh attempt to estimate the value of Salvarsan in diseases of the eye. It is apparent that we are still far from a settlement both of the general question of the applicability of the treatment in ophthalmology, and of many problems as to the size of dose, frequency of administration, etc. Wiegmann finds a general agreement as to the beneficial results of Salvarsan in syphilitic diseases of the eyelids, iris, and ciliary body, and as to its failure in interstitial keratitis. There is, of course, no unanimity on either of these points, and opinion is pretty equally divided in regard to the results obtained in affections of the optic nerve and retina, and in paralysis of the ocular muscles. A considerable number of complications have been attributed by different authors to the remedy in question, including neuro-retinitis, paralysis of accommodation, paralysis of the third nerve, central chorio-retinitis with hæmorrhages, retro-bulbar neuritis, and icterus. Deaths have been reported from hæmorrhagic encephalitis, atrophy of the liver, and paralysis of the diaphragm. Most of the deaths have occurred in the subjects of cardiac and vascular disease.

The author's own cases are as follows.—(1) Female, aged 27, ophthalmoplegia interna. Wassermann positive. One injection of 0·4 gram. Salvarsan. A month later, normal with the exception of slight dilation of the pupil. (2) Husband of No. 1, aged 33. Ophthalmoplegia interna and externa. Wassermann positive. One injection of 0·6 gram. Two months later, the ptosis and ophthalmoplegia interna cured, but no change in the extrinsic muscles. (3) Male, aged 38. Ophthalmoplegia interna. v. Dungern reaction positive; Wassermann negative. One injection of 0·6 gram. Complete recovery in four months. (4) Male, aged 34. Ten years after syphilitic infection, ophthalmoplegia interna, paralysis of superior rectus, and partial ptosis. The two latter cured by mercury and iodide, but accommodation and pupil uninfluenced. One Salvarsan injection (0·6) gave considerable improvement in accommodation but had no effect on pupil.

A. J. BALLANTYNE.

(6) The importance of the article by **McIntosh, Fildes**, and **Dearden** is so great for every practitioner who proposes to administer salvarsan, or to

have it administered, as the case may be, that we do not wish to abstract it. It must be read in the original, which, since it appears in a British journal, is within the reach of all. In order to indicate the importance which we have attached to the article, the authors' concluding paragraphs may be quoted :—

"In conclusion, we wish to touch briefly upon another aspect of the toxic saline solution.

"It is of general interest to record the cases of death which have followed the administration of salvarsan ; from such records luminous conclusions may be, and have been, drawn. *The Lancet* itself has recently referred to se eral of these cases in its 'annotations.' From many of the reports, we think a reasonable person could hardly avoid gathering the impression that salvarsan is a dangerous substance, and that fatal results have frequently followed its administration. Incidentally, the suggestion is often present that such fatal results are hushed up by salvarsan enthusiasts in order that the public may not recoil from the risks of treatment. These suggestions emanate from mercury or hektin enthusiasts. Anyone reviewing the incidents which have surrounded salvarsan since its introduction, might reasonably turn from their contemplation with feelings of disgust.

"Thus we read in the *Times* under the heading 'Preparation 606' the following :—

> "Paris, February 7th.—Professor Gaucher has reported to the Academy of Medicine that numerous deaths have occurred in France, Germany, Persia, and Rumania, through the employment of the remedy known as "606", the patients dying in a state of coma after a few injections. Professor Gaucher also complains of attempts to hush up such fatalities in France, and insists that the remedy is deadly and of small therapeutic efficiency.

"We assert that the impression left by this statement upon the great majority of persons will be false.

"Turning to the other side of the question, we find that writers of greater judgment have advised caution in the use of salvarsan or have even presented a volume of objection to it. Such papers have been published in *The Lancet*. It appears to us, however, that many of these objections are open to criticism, in that they presume that a death obviously following an intravenous injection of salvarsan is necessarily *due* to this chemical substance. It is quite clear that when one refers to 'injection of salvarsan' one makes use of a loose expression. The injection consists of water, sodium chloride, sodium hydrate, and usually micro-organisms in addition to salvarsan. As a result of our observations we have come to the legitimate conclusion that these micro-organisms being the cause of the severe reactions which are sometimes met with are also the cause of a number of deaths which have been recorded. Such deaths are, therefore, preventable and not due to salvarsan. We do not think that the microbes are the cause of all deaths following salvarsan ; there are, no doubt, other factors ; we, however, assert without fear of contradiction that the number of deaths and the degree of toxic results will vary largely with the skill of the operator or the facilities open to him. We look upon it as ridiculous to compare the facilities of Persia at the present day with those of Europe, and equally ridiculous to quote results alleged to have been obtained in that country as evidence either against or for the use of salvarsan elsewhere."

Correspondence bearing on the subject of the article just referred to will be found in the *Lancet* for March 16th, 23rd, and 30th. The letters are by Bayly, by Hort and Penford, and by the authors of the paper. ERNEST THOMSON.

(7) The article by **Dor**, of Lyon, consists in a transcription of two cases from the work of Elschnig on this subject in *Archiv für Ophthalmologie*, Bd. LXXX, S. 514-537, with some remarks on an unsuccessful case of his own. ERNEST THOMSON

(8) **Darier,** of Paris, who, as our readers will remember, long ago advocated the administration of antidiphtheritic serum by the mouth in various classes of infection, has lately observed with satisfaction the scientific proof of what was originally an empirical observation. The experiments here referred to are those of Ruppel, who, instigated by Spiess, of Frankfort (an upholder for the last five years of the administration of antistreptococcic serum by the mouth), has experimented with streptococcic infections in rabbits. The infections were caused in various ways, as, for instance, by injecting streptococcic cultures into the uterus after parturition. The serum was then administered by the same channel, and a proportion of the animals saved, the proportion depending upon the earliness of administration of the antistreptococcic serum. But, what is of special interest in the present connection, is that a series of animals was infected by the peritoneum and received the serum by the mouth. It was found that the animals could be saved by the prophylactic or therapeutic use of serum provided the dose of the serum was very large, and, in the latter case, administered immediately after the infection. (15 cc. per day were required for a rabbit.)

Now, in these experiments the animals had the advantage of receiving serum prepared from the same strain as that with which they had been infected. In clinical practice much valuable time is lost in finding a really specific serum, and it is the duty of the practitioner, while waiting for a specific serum, to administer that which lies to his hand, namely, antidiphtheritic serum. The following is the formula :—

Antidiphtheritic serum	20 cc.
Lemon or strawberry syrup	30 grammes
Water	150 ,,

A soup-spoonful to be taken every hour until the bacteriological investigation gives precise indications for the administration of specific sera or vaccines. ERNEST THOMSON.

(9) The results obtained by **Danis**, of Brussels, in five cases of tobacco amblyopia treated by the lecithine method of de Waele, have not been sufficiently constant to permit of definite conclusions being drawn.

ERNEST THOMSON.

(10) In a case of tuberculous dacryocystitis with large fistula **van Lint**, of Brussels, thought it advisable to try to get rid of the fistula before excising the sac. This he succeeded in doing by injecting every two days into the lacrymal sac a quantity of Beck's paste. This preparation is composed of one-third bismuth subnitrate and two-thirds vaseline. van Lint warmed the paste and injected it, by means of a metal syringe, into the sac, *viâ* the lower canaliculus, until it emerged from the upper canaliculus. After a fortnight of treatment, the fistula had completely healed.* ERNEST THOMSON.

(11) Ten years ago, **Kaz**, of St. Petersburg, proclaimed his belief in the value of eserine in corneal affections, in the formula, "in iritis atropine, in keratitis eserine." His further experience confirms his early results. He claims that he has seen eserine in a few days clear up the cornea and restore vision in trachomatous pannus with opacity reaching down over the pupil after months of atropine treatment ; and he has had equally satisfactory results in strumous ulcers, marginal infiltrates, deep marginal ulcers, catarrhal ulcers, hypopyon-keratitis, and parenchymatous keratitis. It was found that some cases only did well when atropine and eserine were used alternately, and on seeking the explanation of this, it appeared that the atropine acted favourably

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* Beck's paste was recommended by Sydney Stephenson (*Medical Press and Circular*, December 1st, 1909), some time since for the treatment of tuberculous disease of the lacrymal sac.

by giving temporary relief from the too strong action of the eserine. The same good result could be obtained by using eserine alone in weaker doses. He attributes the good effect of eserine to immobilisation of the iris, to the reduction of tension, which eserine produces even in the normal eye, and to the improved drainage of the anterior chamber, caused by opening up the angle and the crypts of the iris. Atropine should be used only when iritis is a prominent feature. A. J. BALLANTYNE.

(12) **E. Löwenstein**, of Berlin, in the effort to produce an albumin-free preparation, has evolved the following culture medium for the preparation of tuberculin :—

Asparagin (as the only source of nitrogen)	6	grammes
Sodium phosphate	2	,,
Sodium chloride	5	,,
Glycerine	40	,,
Water	1,000	,,

The tuberculin prepared with this medium, is called "Asparagin Tuberculin," and inasmuch as it is free of albumoses, which are poisonous and give rise to elevation of temperative, it is particularly suitable for ambulatory treatment.

The reviewer knows that this tuberculin is being tested at the German *Augenklinik* in Prague by the writer's brother Arnold Löwenstein, and looks forward to hearing more on this subject later on. ERNEST THOMSON.

(13) **Smith**, of Amritsar, publishes what must be considered as a preliminary note on the treatment of the early stages of senile cataract by the subconjunctival injection of 1 in 4000 cyanide of mercury. The method was come upon accidentally. Smith desired to try to reduce corneal nebulæ in a patient who also had cataract. The result was a marvellous improvement in the vision according to the patient's statement, but, in this case, Smith does not seem to have seen the patient after the first and only injection. The case, however, proved stimulating, and he determined to try the cyanide in other cases of incipient cataract. Eight are reported, including Europeans and educated natives. They show, says Smith, that in some cataracts the result is phenomenally successful, while in others it has not been successful. or only partially so. He is disposed to think that vision that has been reduced by half or less for distance is amenable to treatment, and that the most promising cases are those in which distant vision has been reduced by about 30 per cent. or under. It is only right to say that while in every case the exact vision, so far as may be possible, before and after the treatment, is stated, there is no note in any one case of the condition of the lens after the injection of the cyanide. as compared with its previous condition. This is probably due to the circumstances of Indian practice. On account of the painful nature of the treatment, Smith gives a little chloroform, and a hypodermic injection of at least one-third of a grain of morphine. ERNEST THOMSON.

(14) **Colombo**, of Parma, claims to have obtained very encouraging results with instillation of gonoccocal serum in conjunctivitis neonatorum due to the gonococcus. He has used it in eight cases. The treatment employed was, twice daily bathing of the eyes with perchloride lotion, swabbing of the conjunctiva with silver nitrate, followed by neutralising with salt solution, and, after drying the lids and conjunctiva, instillation of the serum. The addition of the serum to the other items of the treatment shortens the period of inflammation and purulent discharge, reduces the œdema of the lids, and prevents the occurrence of corneal opacity. He does not think that the serum has a direct action on the organism or its toxins, but attributes its action to a reduction of the virulence of the gonococcus. A. J. BALLANTYNE.

BOOK NOTICES.

Textbook of Ophthalmology in the form of Clinical Lectures. By Dr. PAUL ROEMER, of Greifswald. Translated by Dr. MATTHIAS LANCKTON FOSTER. Volume I. London: Rebman Limited, 129, Shaftesbury Avenue, W.C. 1912. Price 10s. 6d. net.

Professor Roemer's *Lehrbuch der Augenheilkunde in der Form klinischer Besprechungen* has already (March, 1911) been noticed very favourably in the columns of THE OPHTHALMOSCOPE. We are now provided with a translation, commenced by the late Dr. P. W. Shedd and completed by Dr. M. L. Foster. The translators have largely succeeded in reproducing the force of the original wording. The present volume deals only with external diseases of the eye as they affect the conjunctiva, cornea, iris, and lens. The plan of issuing volumes separately in this way has drawbacks as well as advantages, particularly from a reviewer's point of view. For that reason a detailed notice will be reserved until such time as the work is completed.

A Handbook of the Diseases of the Eye and their Treatment. By SIR HENRY R. SWANZY, and LOUIS WERNER. Tenth Edition. Pages XVIII—634 (with 9 coloured plates.) Demy 8vo. Price 12/6 net. London: H. K. Lewis. 1912.

A hearty welcome to the tenth edition of this well-known and much esteemed text-book. As a handbook of what the student requires to know for examinations, and afterwards in practice; nay, more, as a text-book for the man who contemplates special practice; Swanzy and Werner stands in the very front rank among British works. It is with considerable diffidence that one undertakes to review and to criticise such a popular volume.

In this edition the shape of the volume has been altered, and, as stated in the preface, the chapters have been differently arranged. Straightforward description and lucidity of expression remain as before. Anything better than the chapters on the clinical examination of eye patients and the functional examination of the eye, on the ophthalmoscope, on elementary optics, on abnormal refraction and accommodation, and on the orbital muscles, would be difficult to find. The chapter on glaucoma is in general up to date. Thomson Henderson's views are fully acknowledged. The Lagrange and the Elliot operations are given as alternatives to iridectomy in chronic simple glaucoma, but one doubts the wisdom of including Holth's iridencleisis in the list without giving any warning as to its possibilities of danger. Smith's method of intracapsular extraction finds a place in the chapter on the crystalline lens.

The book now contains, for the first time, twenty-one coloured figures on nine special plates. These are from the brush of Dr. Werner and are distributed through the volume in the places where they are described. Many of these figures are really excellent, and Dr. Werner is to be congratulated upon their execution.

The appendix contains the regulations as to the defects of vision which disqualify for the various services; the wools illustrating the Holmgren tests are still to be found attached to the inside of the back cover. Edridge-Green's views on colour blindness and his tests are, however, fully recognised in the text.

Yet nothing is perfect in this very imperfect world. The volume under consideration has its faults. Textual errors like "Thoms*o*n's disease," "Stellwa*y*'s sign," and "t*e*nometer" should not have escaped the proof reader: the first and third of these occur in the text and in the index. But our chief grumble is with the index as a whole. From the point of view of the man who requires to find a subject quickly it is distinctly disappointing that such words as "burn," "injury," "magnet," "rupture," "transillumination," "wound," have no place as separate headings.

The Wassermann reaction is acknowledged by most people to be one of the greatest advances of modern times, yet in discussing the differential diagnosis of tubercle and syphilis, the authors hardly give more than a bare mention to this, and the word is not indexed. Salvarsan receives some mention in the text but none in the index. On pages 185 and 189 a description is given of the methods of using tuberculin for diagnosis and treatment, under the heading of "tubercular iritis," and in other parts of the volume references are made to tuberculin, the above-mentioned pages sometimes being indicated and sometimes not. Yet the word "tuberculin" is not indexed, so that anyone wanting to know about this treatment in eye disease generally, could only get the information by chancing on these paragraphs.

A similar criticism is applicable to "transillumination." The description of an important diagnostic method occupies nearly a page, and there is a diagram of the Leber instrument, but, in order to find out about the use of transillumination one must first be able to anticipate that it will be found under tumour of the choroid.

On the other hand, tonometry is indexed under the heading Schiötz t*e*nometer, but when one turns up the page, there is exactly one line of print about an instrument which is in routine use by a great number of ophthalmologists, more especially on the Continent.

Exenteration of the orbit is not indexed, nor can we find its description in the text, although Krönlein's operation is fully described.

There is a point in connection with magnet operations which we think is worth mentioning. On page 305 it is stated that in all operations for the removal of an intraocular foreign body, it is necessary that the patient be deeply under the influence of an anæsthetic. Apart from the fact that foreign bodies in the anterior parts of the eye do not here seem to be under contemplation at all, such a categorical statement cannot be upheld. Nor is it upheld by the authors themselves, since on page 307 the horizontal giant magnet of Haab and its use are described. The employment of this magnet in the horizontal position, and according to Haab's method, precludes a general anæsthetic.

For the convenience of readers, it may be pointed out that gonorrhœal iritis will be found on page 183, not on page 63 as indexed.

We have made some critical remarks, largely directed to the index, in no captious spirit. We do not forget, however, that this excellent book is not only read by the student of medicine, but is consulted by the busy practitioner who is in haste to ascertain what is authoritative on a particular point in which he may be interested. For the latter type of student a first-class index is a *sine qua non*.

Although the shape of the volume has been altered in this edition, the type and the system of paragraphing, the paper, and the binding, seem not to have changed in essential particulars. ERNEST THOMSON.

Practical Exercises in Physiological Optics. By G. H. BURCH, M.A., D.Sc., F.R.S. Pp. 164. Price 4s. net. Oxford: Clarendon Press. 1912.

As stated in the preface, this book was written for the practical classes in physiological optics required by the regulations for the Diploma in Ophthalmology of the University of Oxford. More than fifty experiments are described which the student is expected to perform himself, his observations being carefully recorded in his notebook. The proposed scheme is excellent, and the latter part of the book deserves high praise, especially the part referring to colour vision. We think that a clear account of Listing's law, with some appropriate experiments, might be added with advantage, as, in our experience, the account of this law is most obscure in the books, and few students have a clear idea of its meaning; but, perhaps, the author thought that this subject was hardly included in the title.

There is no such excuse for the unsatisfactory way in which the subject of dioptrics is treated. The fundamental formulæ dealing with (1) the position, (2) the size of the image, are not given in their general form.

$$(1)\quad \frac{F'}{p} + \frac{F''}{q} = 1.$$

$$(2)\quad \frac{i}{o} = \frac{F'}{F' - p} = \frac{F'' - q}{F''}.$$

In this form these formulæ apply universally to the refraction or reflection of direct centric pencils at a single spherical surface, as well as the refraction of such pencils through lenses of any thickness or through any combination of them. Formula (1) should be taken as the basis upon which, without the least difficulty, a correct and satisfactory theory of cardinal points can be built.

When another edition is called for, we hope that the first section will be carefully revised. A. S. PERCIVAL.

CORRESPONDENCE.

[While THE OPHTHALMOSCOPE will at all times welcome correspondence from its readers, the Editor does not hold himself responsible for any views expressed in this column.]

AN OPERATION FOR GLAUCOMA.

MON CHER RÉDACTEUR,

J'ai lu avec un vif intérêt dans THE OPHTHALMOSCOPE numéro de mai, p. 254 et 258, les articles de MM. Stephen Mayou et Arthur Zorab sur une nouvelle opération du glaucome par le drainage de la chambre antérieure à l'aide d'un fil, amenant ainsi une diminution de l'hypertension.

Permettez-moi de vous faire observer que j'ai proposé jadis ce drainage de la chambre antérieure contre l'hypertonie et la douleur (*Revue générale d'Ophtalmologie*, 31 juillet, 1907). J'ai décrit cette opération, nouvelle à ce moment, et ai rapporté deux observations montrant que la mise en place d'un crin lors d'hypertension glaucomateuse peut être suivie d'hypotension avec retour progressif au tonus normal.

Votre bien dévoué

E. ROLLET.

Professeur d'ophtalmologie à l'Université.

LYON,
le 17 *mai*, 1912.

"THE OPHTHALMOSCOPE" DIARY.

July.

11th. Ophthalmological Society U.K. (Annual General Meeting).

18th—19th. At Keble College, Oxford, Oxford Ophthalmological Congress.

24th—26th. At Liverpool, the annual meeting of the British Medical Association, Section of Ophthalmology.

August.

3rd—5th. At Heidelberg, Ophthalmologische Gesellschaft.

20th—22nd. At Niagara Falls, Ontario, the American Academy of Ophthalmology and Oto-Laryngology.

NOTES AND ECHOES.

DEATH has been busy in our ranks of late.

Deaths.

We have to deplore the demise of Robert N. Hartley, of Leeds, at the age of 58 years. He studied under Sir William Bowman at the Moorfields Hospital. Whilst acting as one of junior house officers at the Leeds General Infirmary, Hartley was the victim of a criminal assault, to which he always traced the epileptic attacks from which he suffered ever after. Nevertheless, he proceeded to his degree; was appointed on the staff both of the Leeds Dispensary and Infirmary; and established himself as a specialist in surgery and ophthalmology in Leeds. He was closely associated with Mr. T. Pridgin Teale. He relinquished his post to the Leeds Infirmary in 1896 on account of the state of his health.

Dr. William Coulter, a former house surgeon to the Moorfields Hospital, has died at his residence, Highwick, near St. Albans, at the age of 64 years.

Dr. Ludwig Bach, professor of ophthalmology in the University of Marburg, Germany, died on May 10th last in his forty-sixth year. He assisted J. v. Michel at Würzburg from 1891 to 1900. He succeeded to Hess at Marburg in the autumn of 1900. Bach was distinguished for his work upon the bacteriology of the eye, the reactions of the pupil, and malformations of the eye.

Dr. W. M. Gunning, sometime professor of ophthalmology in the medical faculty of Amsterdam, is dead, at the age of 76 years. He was one of Donders's earliest pupils.

Dr. Carl Kunn, an authority on the relationship between diseases of the eye and those of the nervous system, died on May 23rd. He was editor of the *Wiener klinische Rundschau.*

Dr. F. L. D. Rust, of Boston, U.S.A., has succumbed to septicæmia, at the age of 38 years.

The death is announced at the age of 63, of Dr. F. L. Ives, who for many years was a member of the staff of the New York Eye and Ear Infirmary.

* * * *

Appointments.

DR. SCHIECK, of Göttingen, has been appointed professor and director of the Königsberg *Augenklinik* in succession to Professor Krückmann.

Dr. K. Orlow, of Kasan, has been appointed professor of ophthalmology in Warsaw.

Dr. W. Krauss has been appointed professor of ophthalmology in Marburg, in place of Ludwig Bach, deceased.

Dr. Alfred Leber, of Berlin, has succeeded Dr. Schieck as director of the University Eye *Klinik* at Göttingen.

Dr. Hermann J. Pagenstecher has been nominated *privat-dozent* of ophthalmology at Strassburg, Dr. F. Grignolo at Genoa, Dr. O. Orlandini at Rome, and, finally, Drs. W. Meissner and A. Bruckner at Berlin.

Mr. G. Constable Hayes, ophthalmic and aural surgeon at the Leeds General Infirmary, has been appointed University Lecturer in Otology.

Mr. Priestley Smith has been appointed consulting ophthalmic surgeon to the West Bromwich District Hospital, in place of Mr. A. E. Chesshire, resigned.

Dr. D. Alvarez has been appointed professor of ophthalmology in the University of Guatemala.

* * * *

Nagel's Jahresbericht.

THE publication of this most useful compilation, of which the late Julius v. Michel was the editor, will be continued by Dr. Hetey, of Berlin.

* * * *

Dr. E. Landolt.

THE many British friends of Dr. Landolt will be glad to learn that our distinguished and genial Paris *confrère* has been nominated an honorary member of the Vienna Medical Society.

* * * *

Professor Hirschberg.

UPON Professor Hirschberg, of Berlin, has been bestowed the honorary doctorate of the University of Athens.

* * * *

Presentation to a Hospital Chairman.

A PRESENTATION has been made to Mr. H. H. Hornby, who has completed fifty years service as member of the committee of the Liverpool Eye and Ear Infirmary. A suitably inscribed silver salver was presented to Mr. Hornby on behalf of the subscribers by Lord Derby.

* * * *

Nystagmus in miners.

A DISCUSSION on coalminers' nystagmus will take place on the afternoon of July 19th next at the Oxford Ophthalmological Congress. It will be opened by Dr. T. Harrison Butler, of Leamington, and among others the following gentlemen have promised to take part: Dr. J. Court, Dr. Llewellyn, Mr. J. Jameson Evans, Mr. R. J. Coulter, Mr. Bernard Cridland, Dr. H. Tomlin, Mr. R. H. Dickson, Mr. S. McMurray, Dr. H. S. Elworthy, and Dr. A. C. Norman. In view of the renewed interest in the subject of nystagmus in miners, it is to be hoped that the Congress will reach some definite conclusions on the matter. An official pronouncement would seem to be most desirable at the present moment.

* * * *

The Royal London Opnthalmic Hospital.

THE fund opened by the Committee of the Royal London Ophthalmic Hospital (Moorfields Eye Hospital) to endow a bed in memory of King Edward VII. has now been closed, and, with the approval of the King, a tablet has been placed above the bed.

* * * *

The Budapest Eye Klinik.

PROFESSOR EMIL v. GROSZ has been kind enough to send us a copy of the pamphlet describing the fine new *Augenklinik* at Budapest, of which he is the chief. When our Sub-editor was in Vienna recently he heard a great deal about this klinik, and it remains with him a matter of constant regret that circumstances prevented him from extending his trip to Budapest and making the acquaintance of Professor Grosz and seeing his hospital.

* * * *

Distinctions.

PROFESSOR HENRI DOR, of Lyons, France, has been nominated *Chevalier de la Legion d'Honneur*.

Surgeon-General A. F. Bradshaw, C.B., who for many years has been honorary secretary of the Oxford Eye Hospital, has been promoted from Companion to Knight Commander of the Order of the Bath. Sir Alexander was present at the siege of Lucknow in 1857. He received the C.B. in the year 1891.

* * * *

The Committee on Industrial Diseases.

AS everybody knows, a committee has been appointed by the Home Secretary to report whether certain diseases can properly be added to those enumerated in the third schedule of the Workmen's Compensation Act of 1906. Among these disorders is "Spasm of the eyelids, apart from nystagmus." In answer to our enquiries respecting this condition, we have been favoured with the following official letter:—

HOME OFFICE, WHITEHALL, S.W.,
6th June, 1912.

SIR,—In answer to your letter of the 31st ultimo, I have to explain that it has been represented to the Secretary of State that there are cases in which workmen, *e.g.*, miners, suffer owing to the nature of their work from an involuntary twitching of the muscles of the eyelid, as distinguished from the oscillation of the eyeball itself, which is a recognised symptom of nystagmus. The fact and extent of the existence of this condition, apart from nystagmus (which, as you probably know, is already scheduled) and the question in what, if any, trades it occurs or is common, are among the matters on which the Committee will take evidence. At present I am afraid there is no other information I can give you.

Yours sincerely,
ARTHUR LOCKE,
Secretary to the Departmental Committee on Industrial Diseases.

Editor of THE OPHTHALMOSCOPE,
24, Thayer Street, Manchester Square, W.

Annual Meeting of the British Medical Association.

AS already announced, the annual meeting of the British Medical Association will be held this year at Liverpool. The following are the subjects selected for discussion in the Section of Ophthalmology, together with the names of the openers of the several discussions:—

July 24th.—Irido-cyclitis. By Mr. George Coats.

July 25th.—Tuberculin and serum therapy. By Dr. George Mackay.

July 26th.—Salvarsan. By Mr. Sydney Stephenson.

THE OPHTHALMOSCOPE.

A MONTHLY REVIEW OF CURRENT OPHTHALMOLOGY.

VOL. X.—No. 8.] *AUGUST 1, 1912.* [TWO SHILLINGS.

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ORIGINAL COMMUNICATION.

A CASE OF RHINOSPORIDIUM KINEALYI OF THE CONJUNCTIVA.

BY

LIEUT.-COLONEL R. H. ELLIOT,
M.D. (LOND.), F.R.C.S (ENG.), ETC., I.M.S.
SUPERINTENDENT, GOVT. OPHTHALMIC HOSPITAL, MADRAS,

AND

CAPTAIN A. C. INGRAM,
M.D. CANTAB., I M.S.,
FOURTH PHYSICIAN, GENERAL HOSPITAL, MADRAS, S. INDIA.

K. MOHIDEEN HAJIAR, aged 60 years, Muhammadan male, residence: Kallangudy, Tinnevelly District, admitted to the Government Ophthalmic Hospital, Madras, under the care of Major Elliot on November 18th, 1910. Disease.—Rhinosporidium Kinealyi of the Conjunctiva.

Mohideen Hajiar.

History.—The patient says that about five years ago he noticed a small painless growth of the size of a black-gram seed (5 mm. by 3 mm.), about a quarter of an inch below the outer third of the lower lid. It has been steadily growing in size ever since. About two years after the appearance of the above growth, he noticed another small growth on the inner surface of the outer third of the same lid. This also has been growing similarly without causing any discomfort. He was not aware of the presence of the swelling on the inner side of the orbit until his attention was drawn to it in Hospital.

He has resided nearly all his life in Tinnevelly District. One year and eight months ago he paid a visit of a few days' duration to Calicut (West Coast of India), where he lived with friends, and before this he had thrice travelled to Mecca. So far as he knows, he has never been in contact with any one suffering from the same disease. His habits have been temperate.

Major H. Kirkpatrick, I.M.S., has most kindly placed at our disposal the following notes, together with the accompanying microphotographs. We are very much indebted to him for so doing.

Present Condition.—(1) There is a pendulous, semi-circular cutaneous over-growth loosely overhanging the upper part of the superior maxillary bone. Commencing from a point 10 mm. downwards and outwards from the inner canthus and 6 mm. below the free border of the lower lid, the overgrowth extends towards the temporal side to a point about 18 mm. internal to the malar prominence. It measures 20 mm. horizontally in its broadest part, *i.e.*, along its upper border, 13 mm. vertically, and 9 mm. in thickness. It is thickest in the most dependent part. It has a fibrous feel, and is not adherent to the deeper structures. There is a mechanical slight ectropion of the lower lid due to the weight of this fold. (2) On everting the lower lid, there is found on the outer two-thirds of it a projecting, reddish, irregular granular mass, with a number of white patches on it, which appear to be retained secretion. The mass itself has a somewhat gelatinous appearance, and enlarged tortuous vessels can be seen over its surface. On pinching up the skin-fold from outside, one can feel the palpebral mass projecting between its folds. On pressure, thick creamy pus escapes from the follicles, and the patient complains of slight pain. (3) Close to the inner canthus there is an elastic rounded tumour, which gives the impression of containing tense fluid. The skin is freely moveable over it, and it lies in the segment of the orbit, downward and internal to the eye. It appears to have adhesions to the surrounding parts. It cannot be emptied on pressure. It lies very distinctly below and to the outer side of what would be the position of a dilated lacrymal sac; it is tender to pressure, but cannot be emptied thoroughly.

Operation.—*November 26th*, 1910.—The œdematous hypertrophied flap of the skin was first excised, and the underlying tumour (on the outer side) was next dissected out, together with that portion of the conjunctiva which was adherent to its surface. Only a small portion of the membrane was thus sacrificed. The mass measured 13 mm. by 10 mm. The tumour on the inner side was then removed. It went rather far back into the orbit and there was very troublesome hæmorrhage afterwards. It felt quite elastic, and on removal, appeared to be a cyst containing what was taken for a mass of blood clot. The cyst was opened during the operation, but appeared to have been removed entire; it was 12 mm. in diameter.

The patient did well, and there was no recurrence when he was seen five weeks later.

Pathological Report by Captain A. C. Ingram, I.M.S.

Three separate portions were received which we have classed as *a*, *b*, and *c*.

(*a*) An irregular growth of tough consistency covered by skin save at its base which had been cut through.

A number of serial sections were made, which showed it to consist of fibrous connective tissue with some irregular proliferation covered by a somewhat flattened layer of stratified epithelium, bearing hairs. There was one large irregular cystic space, full of granular material, with a wall formed of flattened fibrocellular tissue; there were also a few small empty spaces which appeared to be dilated lymphatic spaces. The large cyst was larger than rhinosporidial cysts usually are, and it had no cuticular wall; it was probably an old blood cyst whose contents had become degenerate. Its origin was probably traumatic and not parasitic.

(*b*) A conjunctival polypus removed from beneath the cutaneous growth (*a*). This consisted of fibrous and fibro-cellular tissue containing a considerable number of typical cysts of rhinosporidium Kinealyi; these were of all sizes and were irregularly scattered through the tissue. The surface of the polypus was covered by an irregular layer of transitional epithelium; and close to the surface were a number of large cystic spaces full of granular material. These large cysts were almost all lined by an irregular layer of epithelium derived from the conjunctival epithelium, and some contained degenerate leucocytes in their granular contents.

Almost all the parasitic cysts were more or less distorted and degenerate.

(*c*) Mass from the inner and lower portion of the orbit.

This resembled the first in structure but was somewhat less fibrous and contained a great many well-formed cysts of rhinosporidium Kinealyi; a few of the cysts were barren and degenerate. Two or three cysts showed very well the formation of the pore in the wall described by Major O'Kinealy.

Remarks.—The occurrence in the conjunctiva of parasitic growths due to the rhinosporidium Kinealyi is very unusual and peculiarly interesting.

One of us (A.C.I.) has had an opportunity of examining two previous cases of conjunctival rhinosporidium, but our present case differs from them in the much firmer and more fibrous nature of the polypi; this was probably the result of inflammatory changes due to the irritation set up in the tissue by the presence of these polypi for the comparatively long period of four years; possibly the application of medicaments had also increased the fibrosis.

Apparently, the conjunctiva is not so favourable a nidus for the parasite as the nose and pharnyx, as all the polypi recorded have been much smaller than those usually found in the nose and pharnyx. It is curious, too, that in none of the cases has there been any affection of the nose, since it would appear extremely easy for the daughter cysts to reach the nose by the lacrymal passages.

Report by Major H. Kirkpatrick, M.B., B.Ch., etc., I.M.S., Professor of Pathology, Medical College, Madras.

Two cases of rhinosporidium Kinealyi affecting the conjunctiva presented themselves for treatment during the sixteen months that I acted for Major Elliot at the Ophthalmic Hospital, Madras. Although the clinical notes have been mislaid, yet I have a very clear recollection of the cases, and am in possession of microscopical sections of the more typical tumour. The first tumour was seen in February, 1909. The patient was an Hindu policeman and a native of Malabar on the West Coast of India; he had noticed the growth for some months. The tumour grew from the bulbar conjunctiva of the right eye, its base being narrow and attached to the upper and outer quadrant; it formed a flat red polypus about 9mm. by 8mm. and moved easily with the conjunctiva; on close inspection, a flat fibrous band was seen to run down the centre and the edges were noticed to be yellowish and semi-transparent. I may mention that rhinosporidium affecting the nasal passages always has a very characteristic appearance if at all advanced, forming, as it does, long finger-like processes having semi-transparent edges and a band of fibrous tissue running down the middle like the midrib of a leaf; the appearance in this case was so distinctive that it was possible to recognise the nature of the tumour before removal. The second patient was seen in March 1909, but in this case the growth was much less typical; it formed a red nodule the size of a pea on the conjunctiva of the lower lid. The patient was a native of Tinnevelly in the south of India and is the only person having a rhinosporidium growth that I have seen who was not a native of the West Coast; I believe, however, that the disease is not uncommon in Bengal.

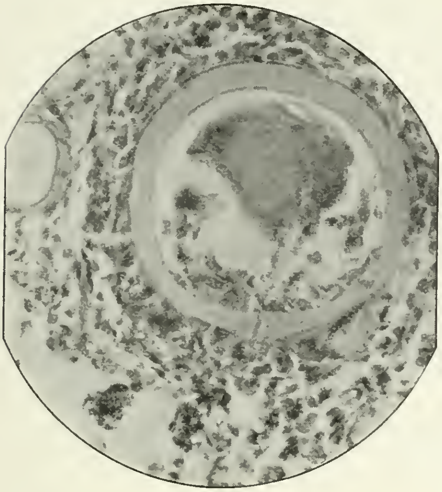

FIG. 1.

Cyst emptied of spore morulæ and invaded by connective tissue cells. Giant cell formation. Note appearance suggestive of a pore in cyst wall. × about 700.

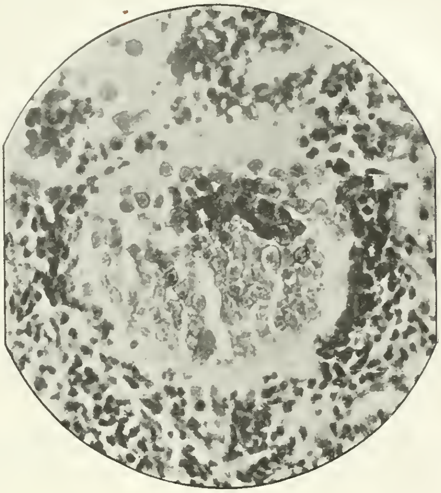

FIG. 2.

Cyst from which spore morulæ are escaping into the surrounding granulation tissue. The cyst wall is degenerating. × about 700.

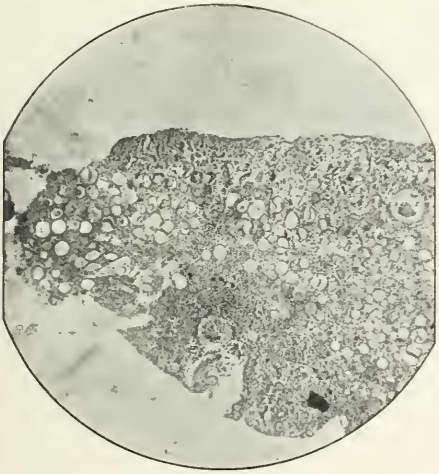

FIG. 3.

Showing large number of cysts on the outer surface of growth. × about 100.

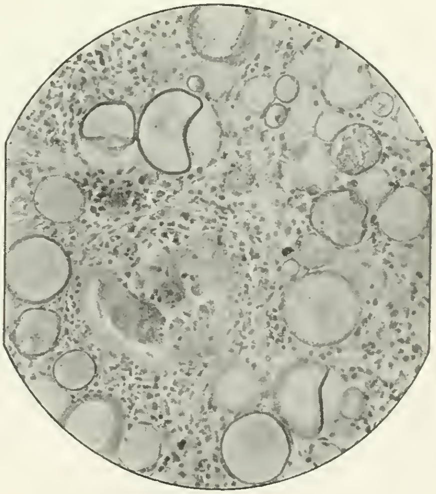

FIG. 4.

Young granulation tissue containing cysts in various stages. A large cyst is undergoing organisation. × about 450.

The microscopical appearances of the first case closely agree with the excellent description of the nasal growth by Dr. J. M. Beattie (*Journal of Pathology and Bacteriology*, Vol. XI, p. 270). The growth was cut so as to show the superficial and deep surfaces; a central core of fibrous tissue which is rather œdematous and contains an occasional cyst separates the surfaces; the outer or more superficial part consists of a young granulation tissue in which are embedded an enormous number of cysts of all sizes and of varying stages of development; there is a sub-epithelial hæmorrhage in one place; the deeper part is similar but contains many fewer cysts. Most of the cysts are empty, a few contain some pure morulæ which can in some instances be seen pouring out of the cysts into the surrounding granulation tissue, a fair number of the cysts are becoming organised, giant cell formation being common. An appearance suggestive of a pore is seen in an occasional cyst wall, but the existence of pores is difficult to demonstrate in stained sections, although they are very clearly visible in fresh teased specimens.

Captain Ingram kindly examined the second specimen, and he states that the appearances in that case were not so typical, only a few cysts being present.

CLINICAL MEMORANDUM.

UNEQUAL PRESBYOPIA,

BY

A. W. STIRLING, M.D.

ATLANTA, GEORGIA, U.S.A.

UNLESS I have overlooked the matter, which is quite possible, inequality in the development in the two lenses of one individual of that change which produces presbyopia, is not considered in the fitting of glasses. It is customary to make a certain addition to both eyes according to age, this being always checked, let us hope, by experiment which takes into account working distance.

But the following two cases would suggest that, in certain persons at least, it may be well to determine the amount of presbyopia in each eye separately.

1.—Mr. L. B., age 46½ years, a very intelligent professional man, whose eyes I have examined frequently and very carefully at intervals during the last eight years, with and without a mydriatic, and about whose distant glasses I have no doubt, complained in February that his left eye seemed to focus for reading at a greater distance than his right. His examination showed the following:—

$$\left.\begin{array}{l} \text{R.V. } \frac{6}{18}\ (\tfrac{3}{4}) \text{ with } \frac{-0.5\text{ D.sph.}}{-1.5\text{ D.cyl.}}\text{ ax. } 5^\circ = \frac{6}{4}\ (\tfrac{3}{4}) \\ \\ \text{L.V. } \frac{6}{18}\ (\tfrac{1}{2}) \text{ with } \frac{-0.5\text{ D.sph.}}{-1.0\text{ D.cyl.}}\text{ ax. } 10^\circ = \frac{6}{4}\ (\tfrac{3}{4}) \end{array}\right\} \left.\begin{array}{l} \text{Same glasses,} \\ \text{ordered for} \\ \text{distance} \end{array}\right\} = \frac{6}{3\cdot5\ (\tfrac{1}{2})}$$

He was ordered +.75 D. spheres with his cylinders for reading, but had considerable discomfort until the left glass was changed to +1.0 D., after which his eye gave him no more trouble.

2.—Mrs. F. K., age 42 years, had a similar experience.

$$\left.\left.\begin{array}{l} \text{R.V. } \frac{3}{36} \text{ with } \frac{+2.0 \text{ D.sph.}}{+1.5 \text{ D.cyl. ax. } 150^\circ} \quad \frac{6}{5} \\[2ex] \text{L.V. } \frac{3}{36} \text{ with } \frac{+1.25 \text{ D.sph.}}{+2.5 \text{ D.cyl. ax. } 90^\circ} \quad \frac{6}{5} \end{array}\right\} \begin{array}{l} \text{Same glasses,} \\ \text{ordered for} \\ \text{distance} \end{array}\right\} = \frac{6}{5}$$

I prescribed for near work:

$$\text{R.E. } \frac{+3.0 \text{ D.sph.}}{+1.5 \text{ D.cyl. ax. } 150^\circ} \qquad \text{L.E. } \frac{+2.25 \text{ D.sph.}}{+2.5 \text{ D.cyl. ax. } 90^\circ}$$

but the eyes were uncomfortable because the book had to be held closer for the left eye than for the right. In this case I did not change the glasses, and in three weeks they had become fairly comfortable.

The object of this communication is to suggest that occasionally an unequal presbyopia may be worth looking for.

NOTES FROM SOME CONTINENTAL EYE CLINIQUES.*

(*Sixth Article*)

BY

ERNEST THOMSON, M.D.,

SUB-EDITOR OF "THE OPHTHALMOSCOPE,"
SURGEON, GLASGOW EYE INFIRMARY.

V.—VIENNA (*continued*).

PART II.—THE DIMMER KLINIK (I. AUGENKLINIK).

Like that of Professor Fuchs, Professor Dimmer's klinik is comprised within the four walls of the ancient *Allgemeines Krankenhaus*, but, unlike the Fuchs' klinik, it has been entirely remodelled, so far, that is, as such remodelling is possible without altering the main construction of the building. Like the other it is all on one floor—out-patient department, lecture-hall, wards and operating room, library and laboratories.

It must be exceedingly difficult to devise a satisfactory new hospital within the walls of an old one, but if one admit the difficulty and the disadvantages due to it, one realises that the best has been done under the circumstances. Professor Dimmer's klinik is in many respects a fine one.

The Out-Patient Department.

The Consulting Room is a very large apartment fitted with every convenience for treatment, and for the surgeon at his work. Instruments and apparatus are stored in cabinets along the walls. Tables for dressings and lotions stand conveniently to hand. There is a pantostat for almost every kind of electrical treatment.

As in Freiburg and elsewhere, the surgeon sits close to the window, with his back to it, and has the patient directly in front of him. The

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*Exigencies of time compelled us to go to press last month without waiting for the return of a proof which had been sent to Professor Fuchs, accompanied by some questions on points about which the author was in doubt. In our correspondence pages in this issue will be found a letter from Professor Fuchs—abbreviated at his own request—which corrects and amplifies certain points.
EDITOR.

window is here east-facing, because north light could not be arranged for. Provided the window is large enough, and the surgeon and patient near enough to it to avoid the surgeon's shadow falling on the patient's face, I believe this to be the ideal arrangement. A general view of the patient in the fullest possible illumination is obtained at the very first. When the illumination is lateral or oblique, or is insufficient, it is impossible to make an instantaneous comparison between the two sides of the face, and between the two eyes, and to take in the general appearance, before one's attention becomes absorbed with the patient's actual complaints and the details of his history.

The position of the surgeon close up to the window may have one disadvantage in our country which is absent on the Continent. There may be a draught from the window. The Continental arrangement of double windows obviates all draught in winter time. In order to carry out this arrangement of surgeon and patient, we should require to provide against draught from the window. Continental heating arrangements in general, although abhorrent to us, have at least the advantage of giving considerable uniformity of temperature.

I noticed that the surgeon on duty at the out-patient department habitually wore rubber gloves. This precaution may, possibly, have been due to some special tendency to infection, since it is not commonly adopted.

The presence of the pantostat in this room led me to enquire of Dr. Lauber, Professor Dimmer's first assistant, about ionic medication. I gathered that it had been tried, and for the most part given up as not obviously better than ordinary treatment.

A small special *Dark Room* separates the consulting room from the refraction room. In this dark room I noticed the Pfister and Streit ophthalmometer, the Zeiss corneal microscope, and the Nagel anomaloscope. Talking of such apparatus impels me to the remark that the regular, systematic use of all available instruments of precision in diagnosis impressed me strongly in Continental kliniks. The ophthalmologist not only possesses all the apparatus he requires, but also has at his service a sufficient number of assistants to enable him to make full use of it. Under our present conditions of hospital work, it is probable that we can never hope to rival Continental State-aided ophthalmology in the matter of diagnostic completeness.

The *Refraction Room*, having on one side the small dark room and on the other side the large ophthalmoscopic dark room, is fitted with stances and types for three operators. Each stance is fitted with two sets of type, the one *direct* for five metres, the other *indirect* for ten metres. Each direct set is composed of two type boards, illuminated by a lamp in front, assisted by lateral mirrors. The indirect type is above the patient's head, is illuminated in a special manner (too difficult to describe without a diagram), and is viewed in a large inclinable mirror situate underneath the direct types. Between the stances are two sets of vertical and horizontal Maddox scales.

In the large *Ophthalmoscopic Dark Room* there are five bays on each side with shelves on the partitions. A small standard lamp, with black chimney having a good sized opening, stands on each shelf. The lamps are fitted with resistances. Up the middle of the room is a partition with four tables, about 14 inches square, on each side of it. Every table has in connection with it an unscreened electric lamp sliding up and down on a friction rod. Two students with their two patients can use each lamp and table. Round the room are fundus and pathological drawings and many fine fundus photographs taken with Dimmer's apparatus. This room can accommodate twenty-four students and as many patients.

The *Lecture Hall* is next to the ophthalmoscopic room. For want of other accommodation, the Zeiss projection apparatus is placed in front of the projection screen instead of behind it, *i.e.*, it stands in the middle of the students' benches. Immediately in front of the screen is a blackboard which can be slid out of the way when the screen is in use. On either side of the screen are plans of the fundus and of the visual field placed behind ground glass, so that chalk drawings and plans can be made and erased. The whole of the long wall facing the students, except the part occupied by the screen, blackboard, etc., is covered with diagrams, while the other three walls of the room are hung with interesting portraits of the previous professors in No. I Augenklinik—Stellwag, Arlt, Schnabel, and others; and support shelves carrying casts, ancient and modern, largely demonstrative of tumours of the cranium and orbit.

Beyond the lecture hall a passage leads to the operating room and the wards.

Beyond the wards, again, are the *Library* and the *Laboratories*. The *Laboratories* are three in number, histological, bacteriological, and optical. The two former have north light and are fully equipped for their work. The optical laboratory has black walls. In this room also classes are conducted in ophthalmic operative surgery.

Photography of the Fundus. Transillumination Apparatus.

A description of Dimmer's klinik could not be considered even moderately complete were it to take no note of a series of dark rooms lying in close proximity to the private room of the Professor.

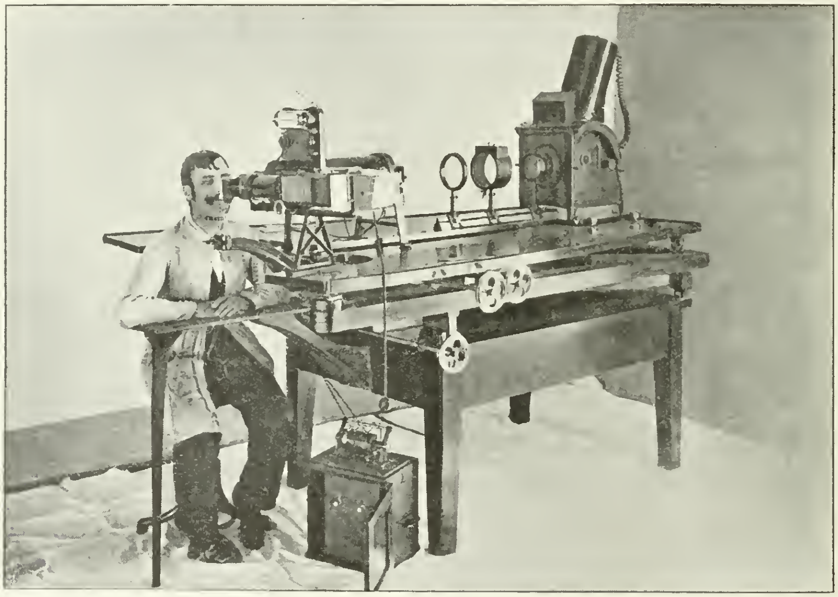
It is not my intention to describe Dimmer's fundus-demonstrating and photographing apparatus in its entirety. It was described by the Professor himself in 1907, and a review of the book will be found in THE OPHTHALMOSCOPE for 1908, p. 140. Early results are reproduced in this journal for 1905, p. 111. I wish, nevertheless, to say something about the method, and through the courtesy of Professor Dimmer we reproduce some of the beautiful results which have been obtained in recent years, and also a photograph of the apparatus with a patient ready to have his fundus recorded.

Although the portion of the apparatus which is used merely for *demonstrating* the fundus is not so very large, the complete mechanism for photography is about the size of a grand piano. It is unsuitable for moving about, and is installed in a dark room. In the figure showing the apparatus the walls and floor of the room have been draped for the sake of obtaining light for the photograph.

For fundus photography the equipment consists of a Zeiss projection apparatus, of an optical combination to throw a fine pencil of rays on a small tongue-shaped mirror and thence into the pupil, of the camera with a specially devised focus-screen, and of electro-magnetic apparatus concerned with the exposure. When used as a demonstrating ophthalmoscope, the arrangements are simpler, since the projection apparatus is replaced by an incandescent gas mantle, while the electro-magnets (required for converting the toned-down focussing light to full illumination, for removing the focus-screen, and for exposing the plate) are not in use. Details of the mechanism and of the method of getting rid of the reflexes must be sought in Professor Dimmer's book. The Professor has just informed me that, whereas formerly an accumulator was required for the electro-magnetic mechanism, the street main is now employed.

The patient's head is kept steady by placing his upper teeth in a wax cast of his own upper jaw. This cast is attached to a metal rod adjustable in a tube. The patient takes his seat and places his upper teeth into the cast. In this connection I may make the remark that the average German is possessed of good teeth which are a part of his jaw and suitable for this operation. Probably in this country of ours a considerable number of patients would find the arrangement extremely inconvenient, although Dimmer asserts that a dental prothesis does not constitute an objection to this method of fixation.

The camera and mirror apparatus, of rigid construction, is adjusted vertically and laterally until the best illumination is obtained with the reduced focussing light. This is done with great exactness by means of hand wheels operating screws. The patient's head having been fixed by means of his teeth in the cast, it remains to provide for ocular fixation. This is done differently in the two cases. For photography the patient fixes the image of a small ball which he sees in the mirror of the camera. The ball itself slides on a rod in the path of the rays emerging from the projection apparatus, while the frame which carries the rod can be rotated in a vertical plane. Thus, the operator can give the patient the image of the ball in any desired part of the field of fixation, and photograph whatever part of the fundus he chooses. For demonstration purposes a different means of ocular fixation has to be adopted. The fixation object is the image of a candle flame seen in an adjustable mirror. The latter method is also employed when the eye to be photographed is amblyopic or actually blind.



Professor Dimmer's apparatus. Patient ready to be photographed.

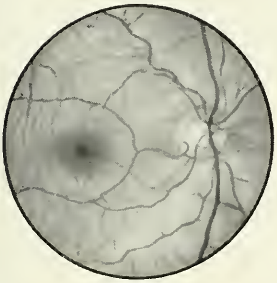
It was my good fortune to make my first visit to Professor Dimmer on a morning when photographic work was taking place, and I saw the whole operation carried out. It is true the apparatus is costly—£200—and not portable, but provided the electrical part is in good order, not much time is

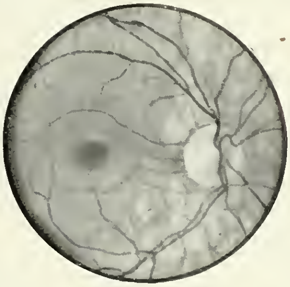
THE OPHTHALMOSCOPE, *August*, 1912.

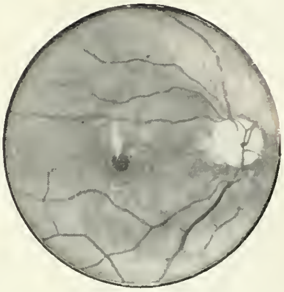
NOTES FROM SOME CONTINENTAL EYE CLINIQUES.

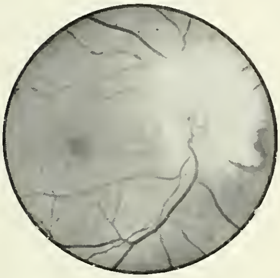
BY

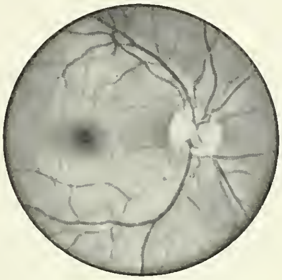
ERNEST THOMSON, M.D.

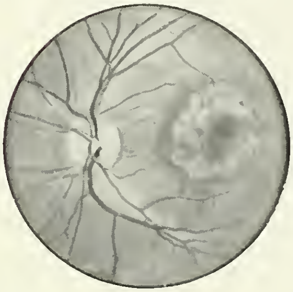

506
Normal fundus, cilioretinal vessel.

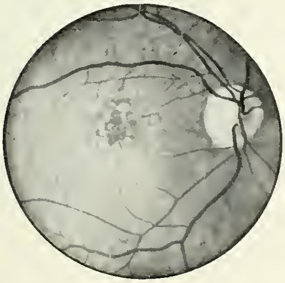

415
Normal fundus, visible vessels of the choroid.

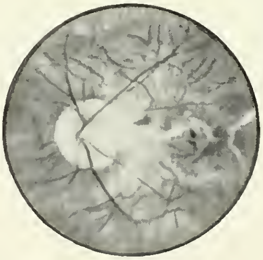

476
"Hole" in the retina, in the fovea.

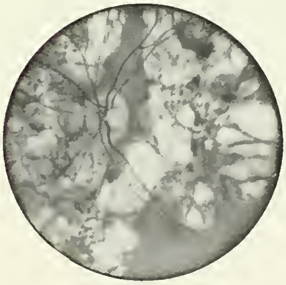

446
Opaque nerve fibres

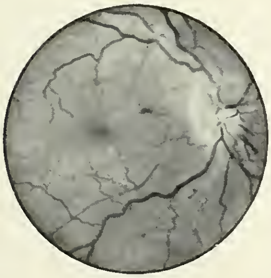

317
Connective tissue on the disc.

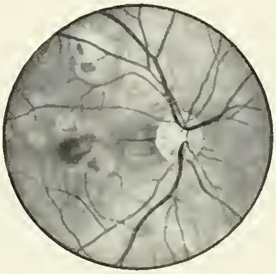

510
Central choroiditis.

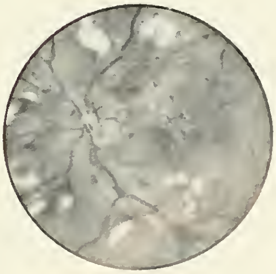

188
Central guttate retinitis (senile change. *Drusen des Pigmentepithels*).


384
Myopic conus ; choroiditis.


473
Retinochoroiditis.


445
Papilloretinitis.


542
Retinochoroiditis.


250
Retinitis albuminurica.

spent in making the exposure, because the arrangements for accurate fixation of the head and eye are so sure. A dilated pupil is a *sine qua non.*

As a demonstrating ophthalmoscope, the instrument is excellent. The absence of reflexes from the ocular media is at once obvious in the purity of the picture of the fundus.

In the developing dark room Hertzell's *ophthalmo-diaphanoscope* is fitted up. This apparatus, which gives an extraordinarily brilliant illumination of the fundus, especially in fair individuals, has already been described by its inventor in THE OPHTHALMOSCOPE for 1911, p. 358. The lamp, in its water-cooled casing, is held in the mouth while the lower part of the face is covered with a black screen. The arrangements for cooling involve a pressure tank and rubber tubing. Now, since operations are necessarily carried out in the dark, great care is advisable to be sure that all joints are tight, otherwise a flow of water over the clothes, accompanied by a corresponding heating of the lamp-tube in the mouth, may make things rather unpleasant for the patient.

The illumination is so great that a transient scotoma may result in an individual with a lightly pigmented fundus.

The Wards.

The wards afford accommodation for 94 patients. They seemed considerably more crowded than in our own hospitals. As one so often finds in Continental hospitals, and private houses too, one room opens off another, a plan which is open to a number of objections.

Operative Technique.

Operating Room. Preparation of Surgeon and Patient, &c.—The operating room is finely equipped. A great deal of money has been expended upon it.

Rigid aseptic *technique* is carried out.

Between the operating room proper and the wards there is an ante-room (*Vorbereitungszimmer*) in which the surgeons prepare for operation. The surgeon first dons an oiled silk apron which extends from neck to knees. This protects his clothes. He then proceeds to the wash-basin and turns a sand glass, indicating how long he must spend in ablution. For hands and arms he uses first Schleich's *Marmerseife* which is practically a fine sand soap, and afterwards a spirit soap. Nail clippers and trimmers lie in a solution of lysoform, 2 per cent. When finished washing, surgeon and assistants put on the usual sterilized overalls on top of their oiled silk aprons. Linen caps, and nose-mouth masks hooking over the ears, are also worn.

The complete hood, as worn by Axenfeld, Elschnig, and others, is not used in this klinik. The assistant wears rubber gloves; the operator himself does not.

It will be remembered that in this Hospital the wards, operating room, and out-patient department are all upon the same floor. The patient is brought into the operating room in his own bed. The bed is suspended in an iron cradle with large castors. In the ward, by means of a ratchet and lever, the bed is raised in the cradle just sufficiently to take the bed legs off the floor. The bed, in the cradle, is then wheeled into the operating room and placed in the required position. The bed is then lowered, so that the feet (which have no castors) rest solidly on the floor. After the operation, the bed is once more raised into the cradle, a few inches, and the patient is wheeled back to the ward. These cradles are not permanent attachments to the beds used for the operating room, but are fitted as required to each bed

Before being brought into the operating room, the patient has had the usual sterile towels adjusted about him and has had several instillations of cocain.

For bulbar operations 5 per cent. cocain is instilled four times in fifteen minutes, and one instillation is made of "Suprareninum hydrochloricum syntheticum" 1—1000. During this period it is necessary that the eyes should be kept closed for the sake of the corneal epithelium.

Arrived in the operating room the skin region is cleansed with benzine and neutral soap, and the gauze veil is adjusted.

I have been unable to ascertain the exact composition of this *ether-free* neutral soap which is so much used on the Continent for the patient's skin. I thought it might correspond closely to the formula of Hebra, which I obtained from a chemist who is in the habit of making it up:—

Linseed oil	3½ ounces
Rectified spirit	3¾ ,,
Caustic potash	5 drachms
Water	5 ,,

Dissolve the caustic potash in the water (in a pint bottle so as to have room to shake). Add the spirit and oil. Shake until clear; then add in successive portions:—

Spirit of lavender	8½ ounces
Rectified spirit	5 ,,
Water	3 ,,

Filter.

Professor Dimmer, however, informs me that, while he does not himself know the composition of the "neutral liquid soap," which is made by Güde in Leipzig, it is not Hebra's. Professor Fuchs writes me that he does not know the formula either, but that in any case the soap is not strictly neutral.

The toilet of the conjunctiva is attended to by the operator himself. He uses a large hand syringe, with a flat metal nozzle. The nozzle is introduced under the upper lid, and the contents of the syringe injected. The solution employed is normal saline. The operator then takes swabs on glass rods, the swabs being wet with normal saline, and wipes over the everted conjunctiva and the fornices, one wipe with one swab, and, finally, wipes over the site of the incision.

The position of the patient, surgeon, and assistants is practically the same as in the Fuchs' klinik, *i.e.*, the surgeons its facing the patient on the latter's right side; one assistant stands opposite the surgeon and another behind the patient's head. But the instrument *technique* is different. The sterilizer is out of reach of the surgeon. Behind the assistant at the bed-head is an instrument nurse. Behind her is the very large instrument tray, in which the instruments lie dry. When the surgeon calls for an instrument, the nurse picks it up by its middle with a long metal tongs designed to hold any instrument securely. She passes it to the surgeon direct. No fingers touch any instrument from the time it leaves the sterilizer until it reaches the surgeon's hand. The nurse attends to the sterilization of the instruments.

A note on some of the operating room fittings may not be out of place. First and most important is the sterilizer. It is the very largest I have seen in an eye hospital. It is probably no exaggeration to call it a "range." This sterilizing range consists of two parts, namely, a large hot plate with numerous gas jets and stands for the boiling of solutions or for keeping them warm, and a large oblong boiler measuring 54 cms. by 34 cms., into which are lowered the instrument trays. These instrument trays are unusually large for an ophthalmic operating room, but it must be remembered that a great many instruments are sterilized at the same time, duplicate and often triplicate instruments being prepared for one operation. These large trays are also suitable for the larger instruments used in operations upon the bone.

The two instrument trays, when removed from the sterilizer, fit into the top of a metal table on castors. This table is provided with a sloping metal hood to protect from dust.

Dressings are prepared in the general sterilizing room of the Hospital. Drops are sterilized in a neat way. A chemical upright stand has a number of clips sliding up and down upon it. Each of these clips clasps the neck of a drop bottle, so that any bottle can be brought over the Bunsen or spirit lamp flame.

Over the operating area is a bunch of electric lights. Under the electrolier is suspended a heavy plate glass. This glass may act as a preventer of falling dust from the electrolier, and would also serve to guard against the unusual event of a broken lamp falling on the patient. The falling of a lamp is not an impossible occurrence. It is said to have happened on one occasion in the Glasgow Eye Infirmary, fortunately without any harmful result.

The method of dressing is practically the same as that described in connection with the Fuchs' klinik.

Individual Operations.

Examination of the Conjunctiva.—The examination of smears is not considered sufficient. The Elschnig method of culture is employed. Strictly speaking, an operation in which the eyeball is opened should not be undertaken in the presence of Gram-positive cocci; yet it is recognised that sometimes it is impossible to get rid of them, and operation has to be risked.

Senile Cataract.—Dimmer's *technique* is as follows.—The assistant supports the upper lid with a Desmarre's elevator and takes the lower lid with his forefinger. The surgeon, after wiping the site of the incision with a moist swab—the last thing before commencing the operation—applies the fixation forceps below and makes the section in the limbus of nearly half the cornea. Sawing movements are avoided as much as possible. A conjunctival flap is made. Except in unfavourable cases the iridectomy is a small basal (peripheric) one. A special forceps, as described by Dimmer in *Archiv f. Augenheilk.*, Bd. LXVII, 1910, is employed. Capsulectomy or capsulotomy follows. The delivery of the lens is accomplished in the following way.—The eyeball is held with the fixation forceps below and pressure is applied on the lower part of the cornea with a Daviel's spoon. The cataract spoon of Hess—to be described in a later article—is applied to the sclera above. The remaining steps call for no special description.

Secondary Cataract.—The patient sits facing the window in a chair provided with a headrest. Focal illumination with a Nernst lamp is employed. The operator sits in front of the patient.

Glaucoma.—In Dimmer's klinik iridectomy is the favoured operation all through. The Lagrange and the Elliot operations, however, are on trial.

Strabismus operations.—In doing tenotomy and advancement Dimmer first secures with sutures the muscle to be tenotomised, so that, should the effect after advancement of the opponent be excessive, he can once more bring forward the tenotomised muscle. In all cases where the squinting eye has a V.A. of at least $\frac{1}{10}$th "simultaneous advancement of the antagonists" is performed, after Landolt's method.

With regard to the advancement operation there are one or two points to be noted. In getting under the muscle and piercing the capsule on its opposite border a sharp pointed squint hook (Landolt) is sometimes employed.

Two silk sutures are used, one end of each being passed separately through muscle and conjunctiva, the other through episc eral tissue in the usual way. Some tissue is excised according to the effect required, and then, with a sharp spoon the episcleral tissue in front of the original insertion is well curetted, while the under surface of the muscle is treated in the same way. The assistant then puts the muscle on the stretch with forceps and pulls it to the cornea while the operator ties the threads.

Detachment of the Retina.—Aiming at the formation of a scar between retina, choroid, and sclera, Dimmer employs the Sachs knife, the pointed and curved blade of which is set at right angles to the handle. The conjunctiva is first of all incised upwards and outwards and the sclera is bared. Then the special knife is introduced and an equatorial incision of all three membranes is made, or attempted. The incision in the sclera is about 5 mm. to 7 mm. long. The method is that of Sachs, of Vienna.

Therapeutic Notes.

Tuberculin.—In this klinik tuberculin is used with considerable enthusiasm. The preparation employed is B.E. of Meister, Lucius, and Brüning. The patients are put through the series of doses as supplied by the firm, so far as may be possible in each individual. This tuberculin is put up in boxes containing ten small sterules. The dose in each sterule is progressively higher than in the previous sterule. There are five such boxes, *i.e.*, fifty progressive doses altogether. The lowest dose is equivalent to five millionths of a milligram of bacillary substance. The patient is at first under observation indoor while undergoing the diagnostic test with old tuberculin, and during the early part of the treatment with B.E. After a time he goes home, takes his own temperatures and marks them down, and comes to the out-patient department every second day to receive an injection so long as the temperature remains normal. Later still, the intervals between the injections are lengthened out.

Salvarsan.—Opinions as to new methods undergo rapid changes. When I was in Vienna, six months ago, it was considered in Dimmer's klinik that the use of salvarsan in eye work was only justifiable in the event of a disease process imminently threatening sight. It is possible this view may now be modified.

Vaccine Therapy is considered, in general, to be of little use. Talking of vaccines reminds one of serpent ulcer of the cornea. For this, Dimmer has had considerable success with 2 per cent. collargol ointment, not as a substitute for the cautery, but in association with it.

TRANSLATION.

7.—GUIDE TO THE MICROSCOPIC EXAMINATION OF THE EYE.

(*Continued.*)

BY
PROFESSOR R. GREEFF,
DIRECTOR OF THE UNIVERSITY OPHTHALMIC CLINIQUE IN THE ROYAL CHARITY HOSPITAL, BERLIN,
WITH THE CO-OPERATION OF
PROFESSOR STOCK (FREIBURG) AND PROFESSOR WINTERSTEINER (VIENNA)
TRANSLATED FROM THE THIRD GERMAN EDITION,
BY
HUGH WALKER, M.A., M.B., C.M.,
OPHTHALMIC SURGEON TO THE VICTORIA INFIRMARY, GLASGOW.

6. STAINS FOR ELASTIC FIBRES.

In recent years quite a number of methods have been devised for demonstrating elastic fibres by means of selective stains.

A. The best known, and until lately the most popular, method is the *Orcein Process of Unna-Taenzer.*

1. Hardening in any of the common media ; formalin seems most suitable.
2. Section cutting.
3. The sections are stained for 12-24 hours in the following solution—

Orcein	0.5
Absolute alcohol	40
Distilled water	20
Hydrochloric acid	drops 20

4. Differentiating in—

Concentrated hydrochloric acid	0.1
Alcohol, 95 per cent.	20.0
Distilled water	5.0

5. Rinsing in water. Dehydrating in alcohol. Oil. Canada balsam.

The elastic fibres are stained dark reddish brown, the nuclei light reddish-brown. A slight tinging with anilin blue causes the elastic elements to stand out better against the delicate red connective tissue.

B. The recently published *Method of Weigert* demonstrates admirably the rich network of elastic fibres present in the tissues of the eye. It yields complete and extremely beautiful pictures. Moreover, it is simple (*Centralblatt für allgem. Pathologie und pathol. Anatomie*, 1898, Nos. 8, 9).

The process is successful with material prepared in most of the hardening fluids. It is specially so when alcohol has been employed ; but Müller's fluid, Flemming's fluid, corrosive sublimate, etc., may be used.

A mixture containing equal parts of—

Aqueous solution of fuchsin-rubin	1 per cent.
,, ,, resorcin	3 ,,

is prepared, and 220 c cm. are placed in a porcelain vessel and brought to the boiling point. To this are added 25 c.cm of liquor ferri sesquichlorati (Ph. G. III.) and the whole is boiled for 2-5 minutes. A deposit is thrown down. The contents of the vessel are allowed to cool, and are then filtered. The filtrate is rejected, and the filter paper is left until all the liquid has drained away. The paper is now placed in the dried porcelain vessel and boiled with

200 c.cm. of 94 per cent. alcohol. The liquid is once more allowed to cool, again filtered, and after removal of the paper made up with alcohol to 200 c.cm. After the addition of 4 c.cm. of hydrochloric acid the staining solution is ready for use.

The sections are placed in the solution for twenty minutes to one hour. They are then dehydrated in alcohol, cleared in xylol, and mounted in Canada balsam.

The elastic fibres appear dark blue or almost black on a light background. The nuclei can be rendered evident by means of carmine, and if a diffuse orange stain is added, the sections are very beautiful.

Liquor Ferri Sesquichlorati is prepared as follows:—

One part of iron is dissolved in 4 parts of hydrochloric acid; and then there are added for every 100 parts of iron dissolved, 260 parts of hydrochloric acid and 135 parts of nitric acid.

See also Pranter's excellent modifications of the processes (Orcein, Resorcin-fuchsin, Cresofuchsin) *Centralblatt für allgem. Pathologie und pathol. Anatomie*, Bd. XIII, S. 292, 1902.

7. DEMONSTRATION OF KARYOMITOTIC FIGURES.

Müller's fluid destroys the chromatin threads, and should not be employed when it is desired to demonstrate the structure of the nuclei. It may be of importance to display this, *e.g.*, in the repair of epithelial tissues or in the case of rapidly growing tumours. The tissues should be placed as soon as possible after death, or after excision of the eye, in a quickly acting fixing fluid, and the pieces should be small to admit of rapid fixation. Osmic acid, as contained in Flemming's solution, can be highly recommended, the staining being in this case carried out with safranin. The resting nuclei are left pale, while those which are in the act of dividing are deeply stained. Or Benda's Method may be adopted (see below). Corrosive sublimate with subsequent staining in hæmatoxylin exhibits the mitotic figures well. Perhaps the best methods are those of Heidenhain and Benda.

Heidenhain's Iron-Hæmatoxylin Method.—When it is desired to demonstrate the finer construction of the cell, such as the centrosome, the achromatic portion of the nucleus, etc., the following is the procedure:—

1. Fixing in a saturated solution of corrosive sublimate. Removal of the sublimate by means of iodine. Imbedding. The sections should be as thin as possible.
2. The sections are mordanted in $1\frac{1}{2}$ per cent. solution of ferric-alum $(NH_4)_2Fe_2(SO_4)_3$, for $\frac{1}{4}$-24 hours.
3. Rinsing in water.
4. Staining in $\frac{1}{2}$ per cent. solution of hæmatoxylin purissimum (Grübler) for 12-18 hours. The iron-hæmatoxylin is deposited in the interior of the sections, staining them a deep black.
5. Rinsing in water.
6. The overstained sections are again treated with the ferric-alum solution, which removes the stain, first from the protoplasm and then from the resting nuclei, so that at last the karyomitotic figures are almost the only structures which are stained. Finally these also are decolourised. The sections must therefore be examined from time to time under the microscope, so that the process of differentiation may be interrupted at the moment when the resting nuclei have become pale, and the karyomitotic figures, on the other hand, are still dark. Differentiation proceeds pretty quickly.
7. Washing in tap water.
8. Alcohol. Oil. Canada balsam.

The nuclei and the nuclear structures appear deep blue or black. Heidenhain's Method is specially adapted for the demonstration of the nuclear structures. It can, however, be recommended as an excellent nuclear stain for general use.

For the demonstration of the finer structures of the cell (centrosome, achromatic spindle, etc.) Heidenhain prefers paraffin sections, 3 μ thick. These are fixed to the slides by means of distilled water, and the sublimate is extracted with iodine.

Preliminary staining with a weak aqueous solution of Bordeaux R.

Rinsing in water.

Mordanting.

Rinsing, etc.

The stain with Bordeaux can also be applied after the hæmatoxylin (*Archiv für mikrosk. Anatomie*, Bd. XLIII, 1894, S. 423).

Bendas Iron-Hæmatoxylin Method:—

1. Hardening in corrosive sublimate, Flemming's solution, or nitric acid.
2. Section cutting.
3. The sections are placed for ½-24 hours or longer in Liquor Ferri Sulphurici Oxydati. (The Liquor consisted of sulphate of iron 80, water 40, sulphuric acid 15, and nitric acid 18. It contains 10 per cent. of iron. Bolles Lee.)
4. They are washed in three changes of tap-water.
5. They are stained in 1 per cent. solution of hæmatoxylin till they become deep black. This, as a rule, takes place quickly.

Pure powdered hæmatoxylin	1
Distilled water	100

6. They are differentiated in 30 per cent. acetic acid till, as in the last method, only the active nuclei are left stained.
7. Washing. Contrast staining if desired.
8. Oil. Canada balsam.

This method is similar to Heidenhain's and produces a good nuclear stain even in the case of resistant tissues. The nuclei become almost black. If differentiation is carried farther, the karyomitotic figures remain deep black to the last and stand out in bold relief.

8. Mallory's Connective Tissue Stain.

1. Hardening in Zenker's fluid.
2. Imbedding in paraffin or celloidin.
3. The sections are stained for 1-3 minutes in a 1 per cent. aqueous solution of acid-fuchsin.
4. Washing in water.
5. The sections are placd for 1 minute or longer in a 1 per cent. aqueous solution of phosphoro-molybdic acid.
6. Washing in water, which should be changed twice.
7. Staining in the following solution:

Anilin blue (soluble in water), Grübler's ...	0·5
Orange G., Grübler's	2
Oxalic acid	2
Water	100

8. Washing in water.
9. Alcohol, 95 per cent., or absolute.
10. Xylol. Balsam.

The connective tissue presents a striking contrast to the other tissues, *e.g.*, tumour cells (L. Aschoff).

10. EPITHELIAL CELL BOUNDARIES.

Shreds of fresh tissue (*e.g.*, conjunctiva) are exposed for 10 minutes to bright sunlight in a $\frac{1}{4}$ per cent. solution of nitrate of silver, which should be freshly prepared.

2. They are then left for $\frac{1}{4}$ hour in distilled water containing a trace of acetic acid (2 drops to a watch-glass).
3. Thorough washing in water.

If desired the preparation may now be hardened.

Demonstration of Definite Substances and Tissue Elements.

1. FAT AND FATTY DEGENERATION.

Normally, the eye rests on a thick cushion of fat, the retrobulbar fatty tissue. Each cell of this tissue consists of a large fat globule surrounded by a thin protoplasmic membrane in which is embedded a flattened nucleus. Fat is found also under the skin of the lids, under the conjunctiva, etc.

Tumours consisting of fat cells are sometimes developed from the connective tissue around the eye, and more frequently from the fat itself (*Lipomata*).

Fatty degeneration is a condition different from, and not to be confounded with, this *Lipomatosis*. In Lipomatosis the increase in the quantity of fat is derived from without ; in fatty degeneration the increase of fat is not due to a deposition of this in the tissue, but results from disintegration of the albumen of the cells. Fatty degeneration is, therefore, always associated with atrophy of the organ. The cells affected contain oil droplets, and, when the process is advanced, the protoplasm of the cell is replaced by a mass of detritus consisting of variously sized globules and granules of fat. In connection with old inflammatory changes in the interior of the eye, especially in old exudations, large vesicular cells are frequently found which are quite filled with fatty granules (*fat-granule cells*). These are generally migratory corpuscles which have taken up the fatty products of degenerative processes, and which by their aggregation form the white patches characteristic of albuminuric retinitis.

The microscopic examination can be easily made in the fresh specimen, either single cells or sections being selected The fatty granules in the interior of the cells are colourless, bright, and possess a dark contour and clear centre. Their behaviour towards reagents is as follows : --

1. They are unaffected when treated with acetic acid.
2. They resist the action of dilute caustic potash and soda (1-3 per cent.).
3. They are stained black on the addition of 1 per cent. osmic acid.
4. They are dissolved by chloroform and ether. To obtain this reaction, the preparation must first be thoroughly dehydrated in absolute alcohol, then exposed for a considerable time to the solvents, again washed in alcohol to remove these, and finally examined in salt solution.
5. When treated with iodine-violet they assume an intense violet colour.

Alcohol should not be employed for hardening, since it gradually dissolves fat. If Müller's fluid is used, the fat granules, although preserved, coalesce into larger drops. The fat-granule cells are thus altered in appearance, and look like vesicles.

1. *Osmic Acid* (OsO_4) possesses the valuable property of rendering black even the smallest particle of fat. When, therefore, it is desired to demonstrate fat or fatty degeneration in a preparation, the hardening fluid employed should be one of those containing osmic acid. This is the case when a retina is being examined for signs of albuminuric retinitis. Pure osmic acid (1-2 per

cent.) is seldom taken; Flemming's solution is more suitable. The eye is opened by two or three short incisions in the equatorial region in the manner already described. It is fixed for 2-3 days in the dark. Longer exposure to the action of the solution renders the tissues too brittle.

The eye is then washed for 24 hours in running water. If the washing is not thorough, the alcohol may extract the uncombined osmic acid, and this may be deposited as black specks giving the appearance of fat where none exists.

Hardening in alcohol, 30, 60, 90, 96 per cent., 24 hours in each.

Imbedding in celloidin.

The sections are stained with safranin.

They are then washed, dehydrated rapidly in absolute alcohol, cleared in oil, and mounted in Canada balsam.

The oil used for clearing must not be allowed to act on the section for a lengthened period, and must be carefully removed as soon as the process is complete. Oil of turpentine and xylol should be avoided as far as possible, because they tend to dissolve the fat which has been acted on by osmic acid. For the same reason xylol-balsam is not chosen for mounting, but solid Canada balsam melted by being warmed over a flame.

Fat which has been exposed to the influence of osmic acid is quite insoluble in alcohol, chloroform, and clove oil.

2. *Sudan III.*, a red powder belonging to the diazo group of colouring matters, is a reliable stain for fatty tissue. A saturated solution of the reddish-brown powder made with ordinary alcohol stains in a few minutes. The preparation is then washed, and mounted in glycerine. Alcohol should be avoided as far as possible, since it dissolves the stain and the fat. Large drops are stained bright-red, small drops yellow or orange-red.

Hardening and fixing solutions which dissolve fat must not be employed. Müller's fluid and glycerine are practically the only media admissible. Sections may be cut with the freezing microtome, whereas the paraffin and celloidin processes must be avoided. Absolute alcohol, which dissolves fat, cannot be used for dehydrating. The clearing oils and Canada balsam are also prohibited.

2. Calcareous Degeneration.

Petrification is a process characterised by the deposition in the tissues of certain salts. These are usually carbonates or phosphates of calcium. The tissues attacked are already necrosed as a result of degenerative or chronic inflammatory changes. Thus, areas which have undergone fatty degeneration and have not been absorbed are frequently affected. The process may even go on to *Ossification*, the formation of true bone with lamellæ and canaliculi. In this condition, however, there is a deposition of salts in a ground substance which has replaced the original tissue. In *Petrification*, on the other hand, there is no alteration in the structure of the tissue. Calcified areas are evident to the naked eye by their white aspect. When touched with a needle they yield a grating sensation. Calcification is often not detected until the mounted specimen is being cut with the microtome. Such tissues must be decalcified. See "Decalcification."

Calcareous deposits when viewed by reflected light are white and glittering, resembling fat; examined by transmitted light they are intensely dark. When a 5 per cent. solution of hydrochloric acid is allowed to flow in from the edge of the cover-glass, the calcium salts are dissolved, the carbonates with the evolution of bubbles of carbonic acid gas, the phosphates without.

If we desire to show the deposit in the tissue unstained, we should employ an aqueous solution of methylen blue. In this way, if we examine with focal illumination or in the dark field, the smallest granules or needles exhibit a glistening appearance.

Alum-hæmatoxylin is by far the best stain for sections which contain, or have contained, lime salts. The chalky portions stain dark blue, sometimes with a tinge of red. It is remarkable that tissue from which the salts have been removed stains almost equally intensely, provided the process of decalcification has not lasted too long. A similar staining reaction is given by tissues which have been deprived of fat, *e.g.*, gliomata, and by the corpora amylacea found in the optic nerve. Larger calcareous areas are, however, readily recognised by their homogeneous appearance, and still more by their contour which is usually sharp and angular.

According to *Leutert* the slightest trace of lime can be demonstrated by the following process:—

1. Staining celloidin sections in a concentrated alcoholic solution of hæmatoxylin, $\frac{1}{4}$-hour.
2. Washing in tap-water, $\frac{1}{4}$-hour.
3. Further staining in 1 per cent. aqueous solution of safranin.
4. Rinsing in water.
5. Differentiating and dehydrating in alcohol. Oil. Balsam.

Lime is stained a deep steel blue; nuclei red. The preparations do not keep well.

3. CHOLESTEARIN.

Cholestearin Crystals are generally present in masses of fatty detritus. In the eye they are often discovered floating in the degenerated vitreous, in the anterior chamber, and in subretinal and subchoroidal exudations. Suspended in the aqueous or vitreous, they present the appearance of minute glittering points. When a fresh eyeball affected with detachment of the retina or degeneration of the vitreous is opened, it is astonishing how often these crystals are present in the liquid evacuated. If numerous they are readily seen with the naked eye as small scintillating dots. Under the microscope they appear as thin transparent rhombic plates, often notched at the angles.

When a few drops of a 30 40 per cent. solution of *Sulphuric acid* is allowed to flow in under the cover glass, characteristic changes of colour take place. The plates become orange, then a beautiful rose-red, and finally are dissolved.

Treated with *Lugol's Solution* (iodine 1, iodide of potassium 2, water 300), the crystals become dark brown, and on the further addition of a trace of sulphuric acid the colour changes to bright blue.

Cholestearin is soluble in alcohol and ether. Hence it follows that, owing to the long exposure in these liquids demanded by the paraffin and celloidin processes, the crystals are, as a rule, no longer visible in hardened and stained sections. Characteristic gaps, however, indicate that they have been present, and these spaces when once recognised can hardly be mistaken.

4. MUCOID DEGENERATION.

The normal epithelium of the conjunctiva, like that of other mucous membranes, contains cells filled with mucin. These resemble goblets, and have been styled *goblet-cells*. Mucin is a transparent substance formed from the cell protoplasm. During secretion the cell swells up, finds its way to the surface, and discharges its contents, the protoplasm being reduced to small groups of granules. The cell may now resume its original form, or it may perish.

In pathological conditions of the conjunctiva the goblet-cells are largely increased in number, *e.g.*, in chronic conjunctivitis, in trachoma, here especially in the gland-like depressions, etc.

Detached cells may be examined while fresh. Mucin swells up readily in water ; it is coagulated in the form of threads or streaks by acetic acid.

Fixation is best performed in formalin or corrosive sublimate. Thereafter the mucous cell contents can be coloured with a simple solution of hæmatoxylin. By this they are stained dark blue, but the flattened nucleus is, as a rule, readily recognised lying against the wall in the deeper part of the cell. Mucin is not stained by carmine or eosin ; when these stains are used the goblet-cells appear as bright spaces in the epithelium. On the other hand, it is particularly well stained by acid-fuchsin (van Gieson's stain), safranin, and methylen blue.

Hoyer strongly recommends *Thionin* for staining mucin. Fixation in sublimate. Washing in water.

The following is the *Method of Leedham Green :—*

The tissues are removed from the animal immediately after death, and placed in a saturated solution of corrosive sublimate for 2-8 hours, the period depending on their thickness and consistence. They are then transferred to 80 per cent. alcohol. Here they are treated with iodine till the sublimate is removed. Next they are dehydrated and imbedded in paraffin or celloidin. The sections are fixed on slides, and stained with a weak solution of thionin (2 drops of a saturated aqueous solution of thionin to 5 c.cm. of distilled water). The staining process lasts 5-15 minutes, till the sections have assumed a dark colour.

Rinsing in alcohol, 90 per cent.

Alcohol, absolute or 96 per cent., for a few minutes.

Clearing in an ethereal oil. Canada balsam.

The mucin of the goblet cells is stained a bright reddish violet, the rest of the tissue bright blue.

Unfortunately this stain is not permanent.

The author finds a weak solution of hæmatoxylin quite as satisfactory.

Meyer's Muci-carmine (Grübler) is a selective stain for mucin.

The sections are stained for $\frac{1}{4}$-1 hour in the aqueous solution diluted 10 times, and then washed in water. Thereafter they may be stained with hæmalum and orange G.

1. Green, " Ueber die Bedeutung der Becherzellen," von Graefe's *Archiv* Bd. XL., Heft. i, S. 3.
2. Hoyer, *Archiv für mikrosk. Anatomie*, Bd. XXXVI, 1890.
3. Wagenmann, " Papillom der Conjunctiva," von Graefe's *Archiv*, Bd. XL Heft. i, S. 250.

5. Hyaline Degeneration.

Hayaline material was separated by von Recklinghausen from the large group of colloid substances. It resembles amyloid substance, being an insoluble albuminous body, and is found in tissues whose nutrition has been impaired.

Hyaline degeneration occurs very frequently in the eyeball as a natural change in old age, but also after any form of chronic inflammation. In an excellent paper Fuchs instances hyaline degeneration as attacking the most diverse structures of the eye. It is found in the arcus senilis and in the primary transverse opacity of the cornea known as Keratitis en Bandelette. It is especially common in the hyaloid membranes (Descemet's membrane, membrana vitrea of the choroid and ciliary body, lens capsule). These membranes may not only become diffusely thickened, but may also exhibit local deposits, the so-called "glands" of the membrana vitrea of the choroid and of Descemet's membrane. Von Recklinghausen instances these "glands" as types of hyaline degeneration. Among senile processes of the same nature are thickening of the supporting fibres of the retina, and the hyaline changes which occur in the connective tissue of the ciliary processes, and in the walls of the blood-vessels in that region. Also of a hyaline nature are the globules of Morgagni, which are separated from the lens fibres in senile cataract. Hyaline degeneration has likewise been found in the optic papilla. Berlin describes hyaline masses as occurring in the infiltration of Sclerosing Keratitis, and Hess has seen a similar change in the epithelial cells in Filamentous Keratitis. Hyaline concretions are common in old corneal opacities (*Atlas of Wedl-Bock*). Vossius has given an exhaustive account of hyaline degeneration of the conjunctiva.

The characteristics of the hyaline substance are, according to von Recklinghausen, as follows :—

1. It possesses a homogeneous structure and high refracting power.
2. It resists most reagents, being insoluble in strong acids and alkalies.
3. It is readily stained by carmine and picrocarmine, less so by hæmatoxylin. Eosin and acid-fuchsin tinge it deeply. It does not give the iodine-reaction with iodine, although its appearance resembles that of the amyloid substance.

The tissue may be fixed in formalin, Müller's fluid, sublimate, alcohol, etc.

1. Berlin, von Graefe's *Archiv*, Bd. XXXIII, Heft iii
2. Fuchs, von Graefe's *Archiv*, Bd. XXXVII, Heft iii, S. 150.
3. Hess, "Fädchenkeratitis," von Graefe's *Archiv*, Bd. XXXVIII., Heft. iii, and Bd. XXXIX, Heft. ii.
4. Kerschbaumer, von Graefe's *Archiv*, Bd. XXXIV, Heft iii, S. 24.
5. Von Recklinghausen, *Handbuch der Allgem. Pathologie*, S. 405, 1883.
6. Vossius, "Die hyaline Degeneration der Conjunctiva," *Ziegler's Beiträge zur path Anatomie*, Bd. V, 1890.
7. Wedel und Bock, *Pathologische Anatomie des Auges*, S. 43. Vienna, 1886.

6. Amyloid Degeneration.

Amyloid degeneration is a peculiar process which frequently attacks the connective tissue of the vascular system ; it is progressive in character. It leads to the deposition of an albuminoid body (amyloid substance) in the affected parts. These as a consequence increase in bulk, and present under the microscope a peculiar homogeneous appearance. When well advanced the morbid change is recognisable with the naked eye, the degenerated tissue being semi-translucent and resembling the fat of fried bacon (Ziegler).

The amyloid substance usually occurs in homogeneous shining patches.

The "waxy" appearance is at once detected when one of the nodular masses is cut open.

The firm consistence of the tissues allows sections to be made in the fresh condition ; or the examination may be performed after hardening in Müller's fluid, formalin, sublimate, or alcohol.

The amyloid substance is stained a rose colour by hæmatoxylin-eosin, a brilliant red or brownish-red by van Gieson's method.

Amyloid substance exhibits certain specific reactions :—

1. *Iodine Reaction* (*Virchow*) :—The sections are placed for 3-6 minutes in Lugol's Solution diluted with 3 parts of distilled water. They are then washed, and examined in glycerine. The degenerated areas are stained

brownish-red, while the unaffected tissue remains bright yellow. The brownish-red colour is rendered still more brilliant if 25 per cent. of glycerine is added to the iodine solution.

This stain is not so permanent as that obtained by the next process.

2. *Iodine and Sulphuric Acid Reaction* (*Langhans*) :—If a section, which has been stained with iodine in the manner described, be treated with a 1 per cent. solution of sulphuric acid, the amyloid substance is tinged a darker brown, or becomes violet, blue, or greenish, according to the length of time the degeneration has been in progress.

3 *Methyl-violet Reaction* :—

(1) Staining for 3-15 minutes in a 1-2 per cent. methyl-violet solution.

(2) Washing in water containing 1 per cent. hydrochloric, or 2 per cent. acetic, acid.

(3) Thorough washing in water.

(4) Mounting in glycerine.

The preparation keeps for a considerable time if the cover-glass is ringed. Canada balsam is not admissible.

The waxy material becomes purple-red, the rest of the tissue blue.

4. *Gentian-violet Reaction* :—This gives almost the same reaction as methyl-violet. The procedure is identical.

Reactions 3 and 4 are not absolutely characteristic. Under certain circumstances other tissues, such as mucin, young cartilage, etc., are stained purple-red.

5. *Methyl-green Reaction:* This is employed in the same manner as methyl-violet. The waxy material stains violet, the nuclei and the rest of the tissue green.

6. *Iodine-green Reaction* :—Sections of fresh or hardened tissue are stained for twenty-four hours in a solution of iodine-green in distilled water (1-300).

They are then washed in water and mounted in glycerine.

The tissue affected stains a reddish-violet, the rest of the section green.

7. *Thionin Stain* (*Kantorowicz*) :—Staining in a concentrated aqueous solution of thionin, 5 minutes.

Washing in distilled water.

Drying on the slide with blotting-paper.

Dehydrating and clearing in anilin oil—xylol (2 : 1).

Pure xylol. Canada balsam.

The amyloid parts stain bright blue or lilac, the unaffected parts bluish or violet.

8. *Method of Birch-Hirschfeld* :—

(1) Staining for 5 minutes in a 2 per cent. alcoholic solution of bismark-brown.

(2) Rinsing in absolute alcohol.

(3) Washing in distilled water, 10 minutes.

(4) Staining in a 2 per cent. solution of gentian-violet for 5-10 minutes.

(5) Washing in acidulated water (10 drops of acetic acid to a watch-glass of water).

(6) Thorough washing in pure water.

(7) Mounting in lævulose.

The degenerated tissues are stained a brilliant red, and stand out in bold relief against the rest of the tissue with its brown nuclei.

Amyloid substance is best distinguished from other semi-transparent material, *e.g.*, hyalin, by means of Virchow's iodine-reaction.

The iodine reaction is also obtained with :—

A. *Corpora Amylacea.*—Amyloid degeneration proper is an affection in which the morbid change occurs diffusely throughout the organ. But in addition to this general form there is a local one, characterised by the occurrence of circumscribed foci of degeneration, or of amyloid concretions. These localised changes are found in the prostate, in the brain, and in the optic nerve, etc. Indeed, they are sometimes found in the otherwise normal optic nerves of old people, especially in the intracranial portion of the nerve and in the chiasma. The patches are usually more numerous if ascending degeneration be present, and are found as far back as the corpora geniculata externa and the optic thalami. They vary in size, and are spherical homogeneous structures lying between the nerve fibres. Iodine in the form of Lugol's solution stains them brown or violet, the rest of the tissue yellow. Acids produce a similar reaction. Carmine stains them red, hæmatoxylin blue.

B. *Beselin and von Hippel* have reported the discovery of concretions resembling amyloid substance in old corneal scars. When the tissue is fixed in Müller's fluid, and the sections are stained with hæmatoxylin, alum-carmine, gentian-violet, acid-fuchsin (van Gieson), thionin, or Weigert's fibrin stain, the deposits become yellow. Gabbet's method for tubercle bacilli (Carbol-fuchsin, 2 minutes; mixture containing 2 per cent. of methylen blue and 25 per cent. of sulphuric acid, 1 minute) stains the greater part of the masses brilliant red, and the background blue. When treated with a solution of iodine, one portion of the deposit becomes markedly mahogany-brown, another part only straw-coloured.

1. Beselin, "Amyloid in der Cornea eines staphylomatösen Auges," *Archiv für Augenheilkunde*, Bd. XVI, S. 130. 1886.
2. Von Hippel, "Ueber das Vorkommen homogener Gebilde mit Amyloid-Reaction in Hornhautnarben," von Graefe's *Archiv*, Bd. XLI, Heft iii.
3. Kubli, "Die klinische Bedeutung der Sogen- Amyloid-tumoren der Conjunctiva," *Archiv für Augenheilkunde*, Bd. X.
4. Raehlmann, "Zur Lehre von der Amyloiddegeneration der Conjunctiva," *Archiv für Augenheilkunde*, Bd. X.
5. Virchow, *Virchow's Archiv*, Bd. VI, VIII, XI, XIV, XV.
6. Vossius, "Ueber Amyloide Degeneration der Conjunctiva," *Ziegler's Beiträge zur pathol. Anatomie*, Bd. IV, S. 335. 1889.

7. FIBRIN.

Fibrin stains well with acid anilin dyes, *e.g.*, picric acid, eosin, acid-fuchsin, etc. Double staining with hæmatoxylin and eosin is often very successful. When the eosin stain is somewhat intense, the network of fibrin is exquisitely depicted, the fibrin being rose coloured. Van Gieson's stain is also suitable; it colours fibrin a brilliant red. Sublimate is the best fixing medium.

Weigert's Specific Fibrin Stain:—

1. Hardening in alcohol, sublimate, or formalin.
2. The sections are stained for five to fifteen minutes in a concentrated anilin water solution of gentian-violet.

N.B.—The solution should not be made up till it is about to be used. It is prepared by adding 5 c.cm. of anilin oil to 100 c.cm. of water, and shaking these thoroughly in a vessel for several minutes. The liquid is then passed through a moistened filter. The filtrate should be clear and free from globules of oil, and should not become cloudy when shaken. A concentrated alcoholic solution of gentian-violet is then added to the anilin water till this is saturated. Saturation is indicated by the appearance of an iridescent metallic-looking film on the surface of the liquid. For 90 c.cm. of anilin water 10-12 c. cm. of the gentian-violet are required. This stain does not keep long.

3. Washing in 0·6 per cent. salt solution
4. Thorough drying with blotting-paper on the slide.
5. Lugol's Solution is poured over the preparation.
6. Drying with blotting-paper.
7. Decolourization in
   Anilin oil 2
   Xylol 1
8. Removal of the anilin oil by means of pure xylol.
9. Canada balsam.

In this way the fibrin is stained an intense blue colour ; everything else, except bacteria, is decolourized.

1. Baumgarten, "Ueber eine eigenthümliche Hornhautveränderung," von Graefe's *Archiv*, Bd. XXIX, Heft iii.
2. Greeff, "Befunde am Corpus ciliare nach Punction der vorderen Kammern," *Archiv für Augenheilkunde*, Bd. XXVIII, S. 128.
3. Leber, "Die Fibringerinnung in der Hornhaut," von Graefe's *Archiv*, Bd. XXXV, Heft ii.
4. Vossius, von Graefe's *Archiv*, Bd. XXXV, Heft ii. and *Ziegler's Beiträge*, Bd. V.
5. Wagenmann, "Experimentelle Untersuchungen über den Einfluss der Circulation," *von Graefe's Archiv*, Bd. XXXVI, Heft iv.
6. Weigert, "Ueber eine neue Untersuchungsmethode des Centralnervensystems," *Centralblatt für die medicin. Wissenschaften.* 1882.
7. Weigert, *Beiträge zur Kenntniss der normalen menschlichen Neuroglia.* Frankfurt, 1895.

8. IRON IN THE INTERIOR OF THE EYE.

When pieces of iron are present in the interior of the eye for considerable periods, the metal is dissolved and deposited throughout the organ. Leber suggests that the iron is dissolved by carbonic acid, carried away as a bicarbonate of the suboxide of iron, and again precipitated in an insoluble form under the influence of the oxygen introduced to the tissues in the blood. Bunge gave the title *Siderosis Bulbi* to the condition in which the cornea, iris, etc., are stained brown by rust. The lens is the structure most frequently attacked. In recent times the condition of Siderosis has been thoroughly investigated by E. von Hippel. He has shown that the brown discolouration of the cornea, iris, and lens, cannot with certainty be ascribed to the presence of foreign particles of iron in the eye, because the same appearances can be produced by the iron contained in the blood. There are therefore two kinds of siderosis, *Xenogenous Siderosis*, due to the presence of a foreign body consisting of iron, and *Hæmatogenous Siderosis*, occurring as a result of hæmorrhages and due to the iron normally present in the blood.

Iron may be demonstrated by two different reactions :—

1. *Perls' Reaction (Berlin Blue)* :—

The bulb should be fixed in alcohol or formalin.

According to von Hippel, the reaction is obtained with sections which have lain for years in Müller's fluid, although it appears more slowly.

Imbedding in celloidin.

The sections are placed in a 2 per cent. aqueous solution of ferrocyanide of potassium for a few minutes.

CURRENT LITERATURE.

NOTE.—Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—COMPARATIVE PATHOLOGY.

(1) **Meisner, Wilhelm.—A spontaneous ulcer of the cornea in the rabbit, and a fœtal keratitis in the guinea-pig. (Ueber ein spontanes Hornhautgeschwür beim Kaninchen und eine fötale Keratitis beim Meerschweinchen.)** *Arch. f. vergleich. Ophth.*, Bd. III, Heft 1, Juni 18, 1912, S. 11.

(2) **Keil, Richard.—Cyclopia in a newly born cat. (Cyklopie bei einer neugeborenen Katze.)** *Arch. f. vergleich. Ophth.*, Bd. III, Heft I, Juni 18, 1912, S. 30.

(3) **Weve, H.—On the supposed astigmatism of the cat's eye, and the significance of the slit-shaped pupil. (Ueber den angeblichen Astigmatismus der Katzenaugen und die Bedeutung der spaltförmigen Pupille.)** *Arch. f. vergleich. Ophth.*, Bd. III, Heft i, Juni 18, 1912, S. 77.

(1) **Meisner,** of Königsberg, observed the spontaneous development in a rabbit of a corneal ulcer. The causative organism belonged to a group allied to the bacillus coli, and was probably the B. cuniculicida immobilis. Pneumonia is caused in the rabbit by this same organism, so that there is a certain resemblance between its action and that of the pneumococcus. A similar case has been reported by Schmeichler.

The second case is more interesting. The guinea pigs were born with opaque corneæ. The eyes were obtained when the animals were three days old, and the one which was least affected showed no breach of the corneal epithelium. The superficial layers of the cornea were infiltrated with polymorphonuclear leucocytes, and contained vessels; the deepest layers and membrane of Descemet were intact. Fibrin and leucocytes were present in the anterior chamber. In the most affected eye a secondary ulcer with perforation had developed. Genuine examples of fœtal interstitial keratitis are rare. The present case was severe, and although no microbes could be demonstrated, it is probable that the inflammation was due, not to toxines alone, but to an actual settlement of micro-organisms which reached the eyes by way of the maternal and fœtal circulations. The affection of all four eyes, however, and of no other tissues in the body, is difficult to explain.

George Coats.

(2) The case recorded by **Keil,** of Leipzig, was one of partial abcranial fission with one fused central, and two lateral, eyes (diprosopus triophthalmus). This median eye gave indications of its double origin by the presence of two partially fused corneæ, two lenses, a median scleral septum, and two retinæ. As is common in such cases, a number of other malformations co-existed, namely, the iris reduced to a small stump, absence of the sphincter and dilatator, partial aplasia of the ciliary processes, cataract, defective development of the zonula, crinkling of the retina, thinning of the sclera, presence of mesoderm with cartilage in the vitreous, etc. George Coats.

(3) It has been asserted by Wolfskehl that the cornea of the cat is highly astigmatic, and that the vertical slit-shaped pupil is of the nature of a

stenopæic aperture for the correction of the error. Weve, of Amsterdam, points out that inasmuch as the cat is a nocturnal animal of prey, which must usually go about with widely dilated pupils, this explanation is unlikely. He pertinently asks why nature should take the trouble to make the cornea highly astigmatic, and then provide an elaborate mechanism for its correction; why not mould the cornea more regularly in the beginning? Owing to the difficulty of examining the living animal, Wolfskehl's measurements were made *post-mortem*, or in the enucleated eye, a procedure which introduces sources of error in spite of all precautions.

Weve found the ordinary methods of narcosis unsatisfactory, owing to the frequent death of the animal. The best results were obtained by the use of 10 cc. of a ten per cent. solution of urethan, introduced by the stomach tube, the chief disadvantage of the method being the dilatation of the pupil which was caused. By means of the Placido disc, the ophthalmometer, and retinoscopy, he proved that astigmatism, corneal or other, is very slight in, or absent from, the central part of the eye. In the periphery there is more, but this is only of importance in extreme dilatation of the pupil. The cats were slightly hypermetropic, and the average radius of curvature of the cornea was 8·6 mm.

GEORGE COATS.

II.—BACTERIOLOGY.

(1) **Monterisi.—A rare affection of the tarsal conjunctiva, of membranous and proliferating type in chronic diphtheria, due to attenuated bacillus of Löffler. (Di una rara affezione della congiuntiva tarsea, a tipo membranoso e proliferante, per difterite cronica da bacillo di Löffler attentuato.)** *Archivio di Ottalmologia*, Ottobre, 1910, p. 299.

(2) **McKee, Hanford.—Conjunctivitis with ulceration of the cornea due to bacillus pyocyaneus.** *Ophthalmic Record*, March, 1911.

(3) **Liégard and Landrieu.—A case of conjunctival mycosis. (Un cas de mycose conjonctivale.)** *Ann. d'Oculistique*, décembre, 1911.

(4) **Verderame, Ph.—The occurrence of true Weichselbaum's meningococcus on the human conjunctiva. (Ueber das Vorkommen von echten Weichselbaumschen Meningokokken auf der menschlichen Konjunktiva.)** *Klin. Monatsbl. f. Augenheilk.*, Februar, 1912.

(1) **Monterisi**, of Naples, records the case of a child of seven years in whose left eye there was a form of conjunctivitis of membranous type, but of chronic nature. The membrane was comparatively easily removed and returned as easily, and in it was found a bacillus closely resembling the typical organism of Löffler. When the membrane was removed, a granulation was found growing from the conjunctiva by a pedicle, and on the surface of this the membrane re-formed. The case ran a slow course until anti-diphtheritic serum was used, when it healed quickly.

The organism was found to be mildly pathogenic in animals, and had the morphological and cultural characteristics of the bacillus of Löffler, and the author is brought to the conclusion that the case can best be considered as one of chronic diphtheria due to attenuation of specific organism.

It is interesting to note that a brother of the patient had true diphtheria (and died of it) eight years before, and another brother had the disease, but recovered after the use of Behring's serum, five years before this case occurred.

LESLIE BUCHANAN.

(2) **McKee**, of Montreal, records a case of severe double purulent conjunctivitis with an ulcer the size of a pin's head just above the centre of the right cornea. The ulcer was deep and the base necrotic. There was no history of trauma. Smears and cultures showed that the causative organism was the B. pyocyaneus. J. JAMESON EVANS.

(3) **Liégard** and **Landrieu** record a case of monocular conjunctivitis, in which examination of the conjunctival secretion showed the presence of staphylococci and a micro-organism growing on gelatine and characterised by very fine non-valved filaments giving origin to chains of very small arthrospores with slightly brown capsule. This was identified as Streptothrix (Nocardia) Dassonvilléi, which is the usual cause of mould in wheat.

R. J. COULTER.

(4) Although the meningococcus has been found by a number of observers on the human conjunctiva, **Verderame**, of Freiburg, points out that in most of these cases there is some uncertainty as to the identity of the organism, owing to the omission to differentiate it completely from other morphologically similar Gram-negative organisms. Nevertheless, he quotes some well verified cases of the occurrence of the meningococcus in conjunctival catarrh, both in healthy persons and in individuals suffering from cerebro-spinal meningitis.

In Verderame's case the organism was discovered accidentally in the slightly hyperæmic conjunctiva of a healthy person whose refraction was under examination. The cultivation of the germ was carried to more than forty generations, and its identity with the meningococcus of Weichselbaum was proved by its morphology, by cultural characteristics, by inoculations, by its response to Lingelsheim's sugar tests, and by agglutination experiments.

No explanation can be offered for the presence of the meningococcus in this case, inasmuch as there had been no case of cerebro-spinal meningitis in the district for upwards of two years. A. J. BALLANTYNE.

III.—CONGENITAL CATARACT.

(1) **Pagenstecher, H. E.—On the experimental production of congenital cataract and deformities in the eyes of mammals. (Ueber experimentelle Erzeugung von angeborenen Staren und von Missbildungen des Auges bei Wirbeltieren.)** *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1911, S. 44.

(2) **Pagenstecher, H. E.—Experimental production of congenital cataracts and malformations in the eyes of vertebrates, with episcopic demonstrations.** *Ophthalmology*, October, 1911.

(3) **de Lieto Vallaro, Agnortino.—A contribution to the study of congenital pyramidal cataract and thoughts concerning its pathogenesis. (Contributo allo studio della cataratta piramidale congenita, e considerazioni sulla sua patogenesi.)** *Archivio di Ottalmologia*, Vol. XIX, No. 6, dicembre, 1911.

(4) **Gilbert, W.—On congenital total cataract and retinal anomalies. (Ueber angeborenen Totalstaar und Netzhautanomalien.)** von Graefe's *Archiv für Ophthalmologie*, 13 Februar, 1912.

(1) It used to be the custom to ascribe ocular deformities to a foetal disease, to toxic and inflammatory noxa. Now the trend of opinion has changed. Every deformity is ascribed to an anomaly of the embryonic cells. Hess believes that central cataract, spindle and polar cataract, and lamellar cataract are true deformities dating from the time that the lental vesicle is separated. He does not go so far as to say that congenital cataract is to be ascribed to anomalies in the germinal cells, but his followers do not hesitate to refer all congenital cataracts to anomalies existing in the primary germinal layers. The experiments of v. Hippel disprove these theories; for he produced cataract by the action of X-rays and cholin upon the fœtus.

Pagenstecher, of Strassburg i. E., has conducted experiments regarding the influence of naphthaline feeding, and has shown that there exists a congenital toxic cataract. By feeding rabbits with 1½ grammes of naphthaline per kilo. he produced congenital cataract in 100 per cent. of the offspring. Is this cataract formation associated with the separation of the lens vesicle or not? Fœtal development lasts 33 days in the rabbit. The lens vesicle is separated on the eleventh day, and on the twelfth the optic fissure closes. To exclude the influence of the separation of the lens vesicle, it is necessary to commence feeding the mother with naphthaline on the twenty-first day.

The results of this procedure were:—

1. A small central cataract.
2. An irregular posterior polar cataract.
3. A spindle-like formation with anterior capsular cataract.
4. A punctate capsular cataract with calcifications.
5. A discoid posterior cataract.

These animals were demonstrated to the Heidelberg Congress. Such results showed conclusively that the cataract was formed late in fœtal life after the separation of the lens vesicle.

The second question to be answered was, "What happens when the stage of separation is influenced by toxic means?" The answer is, that at this epoch naphthaline feeding gives rise to true deformities of the lens. Two animals showed rupture of the anterior capsule. Feeding on the 11th day caused inhibition of closure of the fœtal optic cleft. An experimental iris coloboma and a small choroidal coloboma were shown. Deformities of the lids could be produced, and were shown to the Congress. In fact, Pagenstecher obtained deformities in 50 per cent. of a litter of rabbits, and in 33 per cent. of guinea pigs.

The experiments go far to show that the modern theories as to the cause of abnormalities are incorrect. These deformed rabbits produced normal offspring. T. HARRISON BUTLER.

(2) This is an abstract of an important communication made by **Pagenstecher**, of Strassburg, at the recent Ophthalmological Congress at Heidelberg (see above, No. 1). By feeding pregnant rabbits and guinea-pigs with naphthalin, he produced, in the offspring, congenital cataracts, central, zonular, anterior and posterior polar, and fusiform. The deformities were independent of the process of separating of the lens vesicle, as the feeding was begun after the occurrence of this event. Other maldevelopments produced were coloboma of the iris and choroid, persistent hyaloid artery, posterior lenticonus, coloboma of the lids, microblephary, microcornea, and adhesion of conjunctiva and cornea. Since these deformities occurred in the offspring of animals, which themselves were free from defects and which produced normal offspring after the cessation of the naphthalin feeding, hereditary anomalies of the germ could be excluded, and an interesting light is thrown on the possibility of a toxic origin for congenital malformations. A. J. BALLANTYNE.

(3) **Vallaro**, of Naples, records very fully and carefully the details of a case of very well-marked pyramidal cataract, in which there was nothing to indicate that there had ever been a corneal lesion. Both eyes were affected and presented practically identical appearances. A large horn-shaped opacity, alabaster-white in colour, with a few flecks of pigment at the extreme apex, projected through the pupillary area from the anterior surface of the lens into the anterior chamber. The condition had been present since birth, and no alteration had been recognised, although the patient was eighteen years of age at the time of coming to the clinique. Briefly, the case was operated upon by Angelucci, who skilfully extracted first the cone of cataract and a portion of the anterior lens capsule, and then drew off as much lens as would come. The net result to vision was an improvement, but apparently irido-cyclitis followed, and the ultimate result was not so satisfactory as was hoped.

The histological characters of the tissue removed are described and illustrated in detail, from which it is evident that the cataract formation is composed of alternating layers of epithelial cells and fibrous tissue of almost hyaline appearance. Attention is called to the fact that there is a certain resemblance to corneal tissue, especially to the posterior layers of the cornea, and the inference drawn is that the pyramidal cataract is of structure analogous to that of lens cortex and capsule or Descemet's membrane and its epithelial lining.

Vallaro then presents the various theories which have been put forward to account for these cases of pyramidal cataract in which no corneal lesion is, or has been, present, as follows :—

1. Abnormal persistence of the pupillary membrane (Beck, Vennemann) or perivasculitis of the pupillary membrane (Dor).

2. Incomplete closure of the lens vesicle and formation of an opaque substance in the position of the gap (Ammon).

3. Incomplete or irregular separation of the peduncle which unites the opening of the lens vesicle to the posterior surface of the cornea (Hess, Rochon-Duvigneaud).

4. The action of a toxin, circulating in the anterior chamber and due to intra-uterine iritis or iridocyclitis, which causes irritation of the lens epithelium in the anterior part opposite the pupillary area (Valude, Passera).

Vallaro regards it as probable that a combination of the theories of Ammon and Hess best explains the position of affairs and two illustrations from the *Atlas* of Bach and Seefelder are reproduced to show how the lens vesicle is separated from the cornea.

Some explanation of the origin of the malformation of the lens vesicle may be necessary, and our author suggests that rickets or some similar affliction may predispose to the occurrence of such errors.

The paper is well illustrated by reproductions of photomicrograms and drawings. LESLIE BUCHANAN.

(4) **Gilbert**, of Munich, thinks in his case that total cataract was due to the rupture of the posterior capsule from the shrinking of a persistent mesodermic appendage, which also sometimes causes lenticonus posterior. In his case the examined eye was slightly microphthalmic, but as the other was of normal size and also had total cataract. A similar ætiology seems possible in otherwise normally developed eyes. R. GRUBER.

IV.—PATHOLOGY.

(FOURTH NOTICE.)

(1) **Tchikawa, K.—The trachomatous changes of the scleral conjunctiva. (Ueber die trachomatöse Veränderungen der Scleralbindehaut.)** von Graefe's *Archiv für Ophthalmologie*, Bd. LXXIX, Heft i, April 11, 1911.

(2) **McKee, Hanford.—The histopathology of diplo-bacillary conjunctivitis.** *Ophthalmic Record*, October, 1911.

(3) **Clausnizer, Th.—The anatomy of cysts of the cornea and anterior chamber. (Beitrag zur Anatomie der Korneal- und Vorderkammerzystem.)** *Klin. Monatsbl. f. Augenheilk.*, Oktober, 1911.

(4) **Mihail, D.—Anatomical and pathological condition of the posterior capsule in senile cataract. (Anatomisch-pathologischer Zustand der hinterer Kapsel bei senilem Staar.)** von Graefe's *Archiv f. Ophthalmologie*, 7 November, 1911.

(5) **Phillips, Montagu and Glynn, Ernest E.—Comparative value of certain microscopical methods of demonstrating Spirochaeta pallida.** *Brit. Med. Journal*, November 11th, 1911.

(6) **Rübel and Bayer.—Eosinophile cells in the conjunctival secretion in hay fever. (Ueber eosinophile Zellen im Konjunktivalsekret beim Heuschnupfen.)** *Klin. Monatsbl. f. Augenheilk.*, November, 1911.

(7) **Attias, G.—Fatty degeneration of the cornea in the keratitis of infants. (Fettige Entartung der Hornhaut bei Säuglingskeratitis.)** *Klin. Monatsbl. f. Augenheilk.*, Dezember, 1911.

(8) **Michel, v.—On the nature of chalazion. (Ueber das Wesen des Chalazions.)** *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1911, S. 157.

(9) **Gilbert, W.—On the pathogenesis of cataracta congenita totalis. (Zur Pathogenese der Cataracta congenita totalis.)** *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1911, S. 37.

(10) **Greeves, R. A.—A rare case of primary malignant growth of the ciliary body.** *Trans. Ophthal. Society U.K.*, Vol. XXXI, Fasc. 3, p. 261, 1911.

(1) **Tchikawa,** of Osaka, has examined the scleral conjunctiva in several cases of trachoma, and finds that the general idea of this structure escaping the disease is erroneous. It is, as a rule, involved, and the anatomical characters of its affection are closely allied to those of pannus. The plasma cells are abundant, and there is a thin subepithelial layer of infiltration, which is really the most characteristic feature of trachoma. The pannus seems to be the direct continuation of this process. The author does not believe that the follicles are at all characteristic of trachoma, which, he thinks, is really a form of granular inflammation similar to tuberculosis and syphilis.

R. GRUBER.

(2) The findings of **McKee,** of Montreal, in twenty cases of diplo-bacillary conjunctivitis were.—Infiltration of the epithelial layer with polymorpho-

nuclear leucocytes; profuse infiltration of the subepithelial tissue with lymphoid and plasma cells, which are denser about the blood-vessels, and the plasma type predominated. There were also a few scattered eosinophiles of the mononuclear type. The capillaries were dilated, and showed great numbers of the polymorphonuclear leuocytes. Epithelial diverticulæ and multiple cyst formation in the epithelial layer were also occasionally observed. In other cases the cells of the epithelial layer were ballooned with mucus or swollen with œdema, and many of the lymphatics were engorged with lymphoid cells. Occasionally, the epithelium showed rather a marked polymorphonuclear infiltration which was not present in the subepithelial tissue, and suggested they were derived from the conjunctival sac.

In a series of slides stained by Wright's stain, diplobacilli were easily demonstrated in large numbers on the surface of the epithelial cells and between the epithelial cells, and deep in the subepithelial tissue in smaller numbers.

The author's conclusions are that the true appearance of the tarsal conjunctiva in this form of inflammation is a nodular one. The essential lesion is in the subepithelial layer, and consists of a mild chronic inflammatory process, as shown by the increased connective tissue, the infiltration with lymphoid and plasma cells, and the large number of eosinophiles.

J. JAMESON EVANS.

(3) **Clausnizer**, of Tübingen, describes the case of a young man of eighteen years, who received a penetrating wound of the outer corneal margin from a screw driver. Prolapsed iris was excised, the eye healed quietly and retained almost full vision. Three years after the injury the eye could only count fingers at one metre, and more than half the anterior chamber was occupied by a flat translucent tumour taking its origin from the outer angle of the chamber. An operation for its removal was unsuccessful, and three weeks later, the eye, which was shrivelled and irritable, was removed. Microscopical examination disclosed three cysts. The largest, oval in section, occupied the outer angle of the anterior chamber, lying on the anterior surface of the iris, and fitting into a depression in the posterior surface of the cornea. Its wall was composed of stratified squamous epethelium, and its contents were largely cellular, and apparently derived from the lens and lens capsule. A second smaller cyst lay between the sclera and ciliary body, and was connected with the first, while a third cyst, of much smaller size, was found in the substance of the cornea beside the cicatrix of the original wound. The two smaller cysts, like the first, were lined with stratified epithelium resembling that of the cornea. The three cysts were more or less directly connected and had a common origin, being implantation cysts caused by burying of superficial epithelium when the wound was inflicted.

A. J. BALLANTYNE.

(4) **Mihail**, of Bucharest, has made a study of the condition of posterior capsule in senile cataract. While in about 20 per cent. of the cases the epithelium extends to only a small distance beyond the equator, in about 80 per cent. it covers the whole surface of the posterior capsule. The epithelial cells are of three different types.—(1) The majority are bigger than the anterior epithelium and somewhat approach the endothelial character; their protoplasm is pale and their nuclei show varying degrees of regressive changes. (2) Spindle-shaped cells with large elliptical nuclei, sometimes in several layers and mixed with the first type. They are most commonly seen on the posterior pole and form partial thickenings of the capsule. (3) Cells showing stages of karyokinesis. They are rare and confined to the neighbourhood of the equator. Mihail insists upon the advantages of extraction

within the capsule. Stanculeanu of Bucharest uses a method of his own, somewhat similar to Smith's, and amongst 2,647 cases thus operated a secondary operation was only required in 114 (3.4 per cent.).

R. GRUBER.

(5) The conclusions reached by **Phillips** and **Glynn**, of Liverpool, are as follows.—1. Microscopical examination is a great aid in the diagnosis of primary and secondary syphilis, but is not infallible. 2. Failure to find spirochaetes is more frequent when the sore cannot be reached owing to phimosis. 3. Spirochaetes are more constantly present in condylomata and mucous patches, and far less constantly present in papular secondary skin eruptions than in primary sores. 4. Gland puncture is not of much diagnostic value; typical enlarged indurated syphilitic glands gave negative results in more than half the cases in which spirochaetes were easily demonstrated in the primary sore. 5. Dark ground illumination is undoubtedly the best method of examination; it is the simplest and least open to pitfalls; it is the quickest, not only in the preparation of the film, but also in detection of spirochaetes after the actual microscopical examination has begun. It is the most reliable, frequently giving positive results when other methods are negative, and the different varieties of spirochaetes can be more easily distinguished. 6. The Indian ink method, properly performed, appears to be more reliable than Giemsa's, although enough observations have not been made to ascertain if this is always so. 7. The collection of serum from the syphilitic lesions by the application of spirit is free from certain objections which occur in other methods.

(6) **Rübel and Bayer**, of Freiburg im Breisgau, have had an opportunity to examine the conjunctival secretion of a number of cases of hay fever, and in every case they detected an abnormally large proportion of eosinophile cells. In five cases the blood was also examined, and in no case was there any increase in the eosinophiles. Before publication they have heard of the recent discovery of the same fact by Brown Pusey, of Chicago. The latter suggests that in view of the occurrence of this local eosinophilia in hay fever as well as in spring catarrh, a similar agent, namely pollen, may be the cause of both conditions. The authors of this paper, however, do not think that this theory has much to support it. A. J. BALLANTYNE.

(7) The case of fatty degeneration of the cornea described by **Attias,** of Munich, was that of a badly nourished boy, eight weeks of age. The conjunctiva bulbi was dry-looking, the corneæ were dry and insensitive, and, except for a narrow peripheral zone, of yellowish opaque appearance. An ulcer appeared at the centre of the right cornea, and an epithelial erosion in the left. From the right there came came away during bathing flakes of corneal substance, as much as five mm. in diameter, and about 1/10 mm. thick. Perforation occurred in the right, and caused a leucoma adherens, while a central macula remained in the left. Examination of the exfoliated flakes showed the presence of many encapsuled, Gram-positive, cocci, in pairs and in chains. Little dense opaque spots in the flakes, gave the reactions of neutral fats. There was no evidence of hyaline or other forms of degeneration. The corneal substance had lost its fibrillary appearance, and had become more homogeneous. Nuclear staining was deficient. Fine fat droplets were found between the epithelial cells, and between the corneal lamellæ. The author suggests the name, "Keratitis Exfoliativa," for this unusual condition.

A. J. BALLANTYNE.

(8) **v. Michel**, of Berlin, after passing in review the opinions which have been advanced by Fuchs and others concerning the nature of chalazion, gives a description of the normal Meibomian gland. He then narrates his

investigations upon several cases, and sums up as follows.—(1) Chalazion is always found in the lower half of the upper lid and the upper half of the lower lid. (2) Even clinical examination shows the connection between the disease and the Meibomian glands. (3) The cause of the swelling can without doubt be referred to an inflammation of the Meibomian gland. (4) There is no specific exciter of chalazion; most of the common micro-organisms of the conjunctival sac are capable of causing it. (5) The site of the chalazion is in the loose connective tissue which lies between the palpebral portion of the orbicular muscle and the tarsus. (6) Generally speaking, chalazion can be described as a granulation tumour whose structure is not compact. The presence of foreign body giant cells is characteristic, but the presence of a connective tissue capsule is immaterial. (7) Chalazion may heal leaving a scar behind, but tends to relapse. T. HARRISON BUTLER.

(9) **Gilbert**, of Munich, had the opportunity of making a microscopical examination of a case of complete congenital cataract. The essential lesion was a congenital rupture of the posterior capsule, which had caused total opacity of the lens. Certain abnormalities were present in the retina, such as gaps in the internal limiting membrane. T. HARRISON BUTLER.

(10) The microscopical sections shown by **Greeves**, of London, were obtained from a female, aged ten years, whose right eye presented irido-dialysis, a brownish growth of irregular surface arising from the ciliary region and extending behind the iris, and V.=6/60. On bisection of the enucleated eyeball, a greyish tumour, about the size of a split pea, was found in the ciliary region, encroaching upon the vitreous, the lens (which it had dislocated), the anterior chamber, and the iris. Microscopically, it was seen to be composed of columns of large nucleated cells, mainly of columnar type, no lumen being visible between adjacent rows of these elements. Very little pigment was present. The tumour, which was regarded as malignant, appeared to originate from the inner (non-pigmented) layer of the pars ciliaris retinæ.

SYDNEY STEPHENSON.

V.—EXTIRPATION OF THE ACCESSORY LACRYMAL GLAND.

(1) **Axenfeld, Th.—Extirpation of the palpebral lacrymal gland. (Die Extirpation der palpebralen Tränendrüse.)** *Klin. Monatsbl. f. Augenheilkunde*, März, 1911.

(2) **Fricker, E.—On the extirpation of the palpebral lacrymal gland. (Zur extirpation der Lidtränendrüse.)** *Klin. Monatsbl. f. Augenheilkunde*, März, 1911.

(3) **Fricker, E.—Extirpation of the accessory lacrymal gland. (Nochmals zur Extirpation der Lidtränendrüse.)** *Klin Monatsbl. f. Augenheilkunde*, September, 1911.

(1) **Axenfeld**, of Freiburg i. Br., somewhat disappointed with Toti's operation, has often recourse to the excision of the palpebral lacrymal gland after removal of the lacrymal sac. He dispenses in this operation with the usual eversion of the upper lid, but separates, instead, the lids by the insertion of two small blunt double hooks at the outer canthus. The palpebral lacrymal gland is made prominent by pulling the upper lid sharply up and outwards,

the lower lid down and outwards, the patient looking inwards. After the subconjunctival injection of cocaine-adrenaline, the gland is dissected out, clamped with bent forceps, and cut off. No suture is required.

C. MARKUS.

(2) **Fricker**, of Görlitz, too, finds Toti's operation untrustworthy. He exposes the palpebral gland in the following way.—The upper lid is everted and pierced by a bent needle carrying a silk thread, at a point two to three mm. from the free margin of the lid and a little inside its centre. The lid is pulled upwards and a little inwards by means of a silk thread, while the patient looks down and in. The conjunctiva covering the projecting gland is slit with Graefe's knife, the gland itself seized with toothed forceps, dissected out, and at last cut off with curved scissors. C. MARKUS.

(3) **Fricker**, of Görlitz, described his method for the removal of the accessory gland in the March number of the *Monatsblätter*, and after a further experience of thirty-seven cases he still thinks it the best. The doubly everted upper lid is fixed by means of a thread passed through the tarsus, not more than two or three millimetres from its upper edge. The lower lid is fixed by a double hook inserted near the outer canthus. The assistant pulls the thread up and out, and the hook down and out, and so keeps the field clear for the operator. In extirpating the sac, the author now always removes the accessory gland as well. A. J. BALLANTYNE.

VI.—ELECTROLYTIC OCULAR ANÆSTHESIA.

Contino.—Ocular anæsthesia produced by the electrolytic introduction of the anodyne substances. (Sull' anestesia oculare mediante l'introduzione elettrolitica degli anodini.) *La Clin. Oculistica*, gennaio, 1912.

The animal organism may be considered to be an electrolyte, says **Contino**, surrounded by a permeable membrane, the skin ; its electrolytic property and its conductivity are due to the presence of chloride of sodium in the organic fluids and the blood. If, then, we place in contact with the skin of an animal another electrolyte, we can make anions or cations pass through the skin according to the direction of the current. On the other hand, the dissociation of the Na Cl in the body causes an appearance of the ions of chlorine at the positive electrode and of the ions of hydrogen at the negative electrode. It is the formation of hydrochloric acid in the one case, and in the other, of caustic soda, which occasions the irritation of the skin, if unduly powerful currents are sent through too small electrodes.

Contino gives, on the authority of Battelli, a table of the relation of current in milliampères to the surface of the electrode. (From this table it would appear that up to 7 milliampères, the square of the number of milliampères is, roughly, twice the necessary superficies of the electrode. For higher numbers this does not apparently hold good, and it is merely given by the reviewer as a convenient *memoria technica*.)

Contino has tested various succedanea of cocain.

The electrode which he uses is made up of a rod of glass terminating in an ampulla which has a diameter of 1·5 cm. and a capacity of 5 c.c. The glass rod is traversed by a thick platinum wire, which extends into the ampulla and is connected at the other end with a binding screw. This electrode is connected with the positive pole, and the ampulla filled with the solution of the chosen anæsthetic ; the open end is blocked with a plug of cotton wool, and the cotton wool placed on the skin, which has been previously washed with soap and water. Contino in his experiments has usually placed a fold of gauze, 6 cm. square, damped with the same solution as that in the ampulla, between the skin and the electrode, with a view of regulating the intensity of the current.

In order that we may know accurately the dose of the substance given, we must examine the reaction further. The quantity by weight of elements which substitute themselves in chemical combinations, is known as the chemical equivalent. This one can calculate by dividing the molecular weight by the valency.

According to Faraday's law, the chemical equivalent is directly proportional to the electro-chemical equivalent, *i.e.*, the quantity in weight of ions dissociated by one coulomb. The quantity can therefore be found by multiplying the chemical equivalent of the substance by the electro-chemical equivalent of hydrogen.

(In the text Contino says "dividing"; it is clear that it should be "multiplying," and, in fact, he always multiplies in working out the examples. The full equation is:—

$$\frac{\text{Electrochem : equiv. of } x}{\text{Chemical equiv. of } x} = \frac{\text{Electrochem : equiv. of H}}{\text{Chemical equiv. of H}})$$

When this is known, it is easy to calculate the number of coulombs necessary to effect the necessary dissociation; and then by the formula $q=it$, in which q is the number of coulombs, i the intensity of the current in ampères, and t the time in seconds, to calculate the length of the exposure. The concentration of the electrolyte has no influence on the electrolysis.

Since the various anæsthetics chosen by Contino vary in their molecular weight, the time required for the introduction of a given weight of the substance will vary equally.

He tested the various succedanea of cocain on the skin on the inner side of his upper arm; he found that the introduction of 0·5 centigram of cocain sufficed to give an anæsthesia lasting fifteen minutes or thereabouts, and that a larger dose gave no corresponding increase in duration, no doubt because the drug is carried off, by degrees, by means of the general circulation.

The skin of the affected area, after the removal of the electrode, was reddened and slightly wrinkled; after a few minutes exposure, small punctiform vesicles appeared in the position of the pores; these vesicles fused and the whole became slightly œdematous; at the same time there began a sensation of burning.

As a result of many experiments, Contino concludes that alypin, cocain, and holocain have the greatest anæsthetic effect, and that of these, alypin is by far the least irritating. He has found it possible to prolong the duration of the anæsthetic considerably by adding to the electrolyte on the electrode a few drops of adrenalin chloride; this at the same time causes ischæmia of the parts concerned, making the field practically bloodless, and therefore conducing to the ease of operation.

He recommends the method for all operations on the adnexa. In cases of removal of the lacrymal sac, he suggests that the time of administration—ordinarily five minutes—should be prolonged, in order that the deeper parts may be adequately anæsthetised. On the other hand, where the area of operation is large rather than deep, as in extensive plastic operations, he advises us to increase the current from five milliamperes to ten.

The method seems more applicable to the adnexa than to the eye itself, and thus the title of Contino's communication is slightly misleading.

Harold Grimsdale.

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VII.—FEVER IN INFLAMMATIONS OF THE EYE.

(1) **Hirschberg, J.**—On fever in inflammations of the eye. (Ueber Fieber bei Augen-Entzündungen.) *Centralbl. f. prak. Augenheilk.*, Juli, 1911.

(2) **Abelsdorff, G.**—On fever in inflammations of the eye. (Ueber Fieber bei Augen-Entzündungen.) *Centralbl. f. prak. Augenheilk.*, September, 1911.

(1) **Hirschberg**, of Berlin, mentions the fact that in modern text-books of ophthalmology the occurrence of fever in eye affections is scarcely, if ever, mentioned, while in those of the eighteenth and early part of the nineteenth centuries it is mentioned very frequently. Scientific thermometry was only practised since the middle of the nineteenth century, and Hirschberg finds as the result of experience, that rise of temperature occurs in eye inflammations much less frequently than one would expect. He notes, for instance, that in gonorrhœal conjunctivitis and panophthalmitis, both in the new-born and in adults, there is no fever. In septic panophthalmitis, also, there is no fever. In iritis in five syphilitic cases there was no rise of temperature. In four rheumatic cases fever occurred once in a man who at the same time had chronic articular rheumatism. A. LEVY.

(2) In reference to Hirschberg's paper on this subject, **Abelsdorff**, of Berlin, is also of opinion that rise of temperature is very rare in eye affections. He makes an exception for conjunctivitis of diphtheritic origin. He has found that even in comparatively mild cases of this affection, there is a distinct rise of temperature, and he thinks that if such a rise be noted, it is presumptive evidence that membranous conjunctivitis is diphtheritic. A. LEVY.

VIII.—REMOVAL OF THE EYEBALL AND ITS SUBSTITUTES.

(1) **Hirschberg, J.**—A case of useful neurotomy. (Ein Fall von nützlicher Nervendurchschneidung.) *Centralbl. f. prak. Augenheilk.*, Januar, 1911.

(2) **Dianoux.**—On optico-ciliary neurotomy or isolation of the eye. (De la névrotomie optico-ciliaire ou isolement de l'œil.) *La Clinique Ophtalmologique*, 10 mai, 1911.

(3) **Golowin, S. S.**—Operations on the eyeball after resection of the optic and ciliary nerves. (Ueber die Operationen auf dem Augapfel nach der Resektion des Sehnerven und der Ziliarnerven.) *Klin. Monatsbl. f. Augenheilkunde*, September, 1911.

(4) **Bailliart, P.**—Under what circumstances should enucleation be performed? *Bulletin Général de Thérapeutique*, 6 septembre, 1911.

(5) **Robinson, William.**—Removal of the eyeball: a quick and easy method. *British Medical Journal*, November 11th, 1911.

(6) **Ryan, James P.**—Removal of the eyeball: a quick and easy method. *British Medical Journal*, April 13th, 1912.

(1) It is not often that one hears of a case of optico-ciliary neurotomy nowadays. This operation, much lauded at its introduction some thirty years ago, is not even mentioned in the modern text-books, but **Hirschberg**, of Berlin, records an eminently successful case in which this operation replaced an enucleation, and the result has remained satisfactory up to the present, a period of twenty years. The patient, who was first seen in 1891, had had a left iritis for which an iridectomy had been performed, and three years before being seen by Hirschberg, had had an acute attack of glaucoma in the right eye, for which an iridectomy was performed. The tension still kept high, and a second iridectomy was done with a satisfactory result until 1890. Then corneal inflammation set in, with the formation of bullæ and recurrence of tension, and vision disappeared. This caused very great pain, and treatment was without result, and the question of excision of the eye came up. Hirschberg, who now saw him, thought that optico-ciliary neurotomy would be sufficient, and performed this operation. Since then the patient has been quite free from pain, although the bullæ still occasionally reappear. A. LEVY.

(2) **Dianoux**, in giving his enthusiastic support to this operation, says that he does so on the verge of his retirement, and in order that those who are younger than he may know that this operation has, in his long experience, given him every satisfaction. After describing the rise and fall of the method, he expresses the opinion that it has not really disappeared, but only suffered an eclipse. Since 1876 he has performed over 200 "enervations," and has never been obliged to enucleate on account of sympathetic ophthalmia. Five times he has had to enucleate for other reasons. Dianoux next enumerates the recognised objections to optico-ciliary neurotomy, or "enervation" as he calls it. We shall briefly state how he meets the objections. (1) *The operation is difficult.*—"The *rôle* of surgeon does not suit everybody." (2) *There is likely to be profuse hæmorrhage.*—"The optic nerve should be reached by the nasal side. Sufficient compression is obtained by the suturing of the internal rectus at the end of the operation. If the optic nerve be attacked from the temporal side, the ophthalmic artery and many veins are liable to injury." (3) *Strabismus may result.*—"The globe will take up a correct position when the two ends of the internal rectus are properly brought together." (4) *The cornea suffers from "trophic" troubles.*—"This is the most serious of all objections. The cornea must be most carefully protected by careful bandaging until some sensation returns: this takes place towards the end of the first week. (5) *There is a doubt whether the operation prevents sympathetic ophthalmia.*—"One can answer this according to theory and according to practice. In theory, it seems absurd to suppose that infection will take place *via* the veins of the conjunctiva and eyelids. In practice, Dianoux and his pupils have found the operation perfectly satisfactory. Why has the operation not come into general use after such a brilliant beginning? Our author becomes humorous. "*Il y a des modes, il y a des 'snobs' même en médecine, et il a suffi que des indécis entendissent la voix d'un chef comme Trousseau criant 'tué' pour qu'ils aient en chœur crié: 'assommé!'*" Dianoux does not believe that the operation has ever been abandoned. The faithful practise it without noise, without saying anything about it, as if it were the rite of some suspect religion. It has only one disadvantage, but that has brought it implacable enemies—it does not yield any anatomical specimens. ERNEST THOMSON.

(3) **Golowin**, of Odessa, has for some time practised resection of the optic and ciliary nerves in those cases of absolute glaucoma, where, owing to the presence of pain, one is tempted to enucleate, seeing that iridectomy, sclerotomy, and other operations are difficult to perform or fail to give relief. The

cosmetic result of resection is usually better than that of enucleation, but the subsequent development of cataract is sometimes a drawback. Golowin has found that in such cases extraction of the cataract can be easily and safely carried out. In one of his cases, a young woman of thirty years, there was absolute glaucoma and cataract, with severe pain and much injection. The presence of a tumour was suspected, but he was loth to enucleate without greater certainty. Resection was performed, and there was no trace of tumour tissue in the optic nerve. The eye became quieter, the cornea clearer, and the tension normal. Simple extraction was successfully carried out a month later, and revealed no evidence of an intraocular tumour. The position and movements of the eye were normal. A. J. BALLANTYNE.

(4) The article by **Bailliart** is of a general nature, and seems to offer no leading points to the anxious ophthalmologist on this perennially interesting question.

(5) **Robinson**, of Sunderland, describes a simple way of removing the eyeball, as follows.—The conjunctiva and the underlying tendon of the external or internal rectus tendon, as the case may be, are grasped with fixation forceps and divided by scissors. The conjunctiva is next cut as close to cornea as possible. The eyeball is rotated inwards or outwards, as the case may be, and the optic nerve is cut. The various muscles are then divided, and, lastly, the cut edges of the conjunctiva and subjacent structures are sutured, with the idea of preventing the formation of a button of granulation tissue. SYDNEY STEPHENSON.

(6) **Ryan**, of Melbourne, writes to say that the method of removing the eyeball recommended by W. Robinson was employed many years ago by Aubrey Bowen, at the Victoria Eye and Ear Hospital, Melbourne. Ryan himself still adopts it on occasion. SYDNEY STEPHENSON.

IX.—ATROPHY OF THE IRIS.

Axenfeld, T.—On special varieties of atrophy of the iris, especially hyaline degeneration of the pupillary margin and pupillary pigment atrophy of the posterior layer of the iris. (Ueber besondere Formen von Irisatrophie besonders die hyaline Degeneration des Pupillarsaumes und die pupillare Pigmentatrophie des Irishinterblattes.) *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1911, S. 225. (37th volume, published in 1912.)

For some years **Axenfeld**, of Frieburg i. Br., has interested himself in pupils which dilate imperfectly, although there has been no previous disease of the iris and there are no posterior synechiæ. Up to the present it is not clear why under the influence of a mydriatic some pupils dilate until no iris can be seen, and in others there is only the slightest dilatation. These idiosyncrasies are present from youth up, and do not form the subject of the present paper, which deals with cases in which the pupils of elderly people do not dilate, although the iris is not bound down by synechiæ. There may be many causes for this defect, but one is *hyaline degeneration of the* pupil margin. This condition has received little notice in literature, although Fuchs, Meller, and Seefelder have alluded to it, more especially as regards the histology of the condition. A study of the coloured plate attached to Axenfeld's communication, which was made by Kirchner and Saumer from the view obtained by Zeiss' binocular loup, shows that the pupil is bounded by an opalescent, greyish-white margin which is sharply defined on the pupil side and centrifugally lies partly upon the pigment at the pupil edge, and passes in places across it towards the periphery. This hyaline ring may or may not be complete. It must, however, not be taken for granted that every whitish ring in this situation is due to hyaline degeneration; in some cases the cause is an essential pigment atrophy or depigmentation of the posterior surface of the iris. In old people, and especially in those suffering from senile cataract, the whole pupillary margin may be white. A clinical differentiation is apt to be exceedingly difficult. It is, however, quite easy to separate an early hyaline degeneration from an early depigmentation. A consideration of the figures will make the difference clear.

In most cases where the pupil dilates partially there is present in old people some change such as has been described, or there is a degenerative anomaly in the region of the dilators.

Discussion.

Igersheimer, of Halle, A.S., in the discussion, described a form of atrophy in cases of congenital syphilis.

Hamburger, of Berlin, pointed out that when the iris atrophies, many vessels and lymph spaces disappear, and so many channels of absorption are lost. This explains why iridectomy is so useless in some cases of chronic glaucoma.

Leber, of Berlin, said that in many of these cases the rigidity of the pupil was not due to atrophy, but to a thin sheath of connective tissue which covered the iris, and, by contraction, everted the uveal layer, and caused ectropion of the sphincter pupillæ.

Axenfeld added that the appearance noted by Leber was present in eyes which were essentially pathological. T. HARRISON BUTLER.

X.—THE ACCESSORY NASAL SINUSES.

(1) Krauss, Frederick.—Report on a case of unilateral retrobulbar neuritis due to ethmoiditis, with restoration of vision. *Ophthalmic Record*, May, 1909.

(2) Nourse, Chichele.—Chronic suppuration of the left frontal sinus, with displacement of the left eyeball and diplopia; operation; recovery. *Proceedings of the Royal Society of Medicine*, April, 1910.

(3) Birch-Hirschfeld, A.—Pathology and treatment of orbital phlegmon. (Zur Pathologie und Therapie der Orbitalphlegmone.) von Graefe's *Archiv für Ophthalmologie*, Bd. LVII, ii Heft, 10 April, 1910.

(4) Fullerton, Robert.—On mucocele of the nasal sinuses and its complication by optic neuritis. *British Medical Journal*, 16th April, 1910.

(5) Truc, H., and Lemoine, P.—Bilateral mucocele of the frontal sinus. *Revue Générale d'Ophtalmologie*, 31 mai, 1910.

(6) Schirmer, Otto.—Optic nerve affection due to ethmoiditis. *American Medicine*, August, 1910.

(7) Wood, C. G. Russ, and Wallis, G. F. C.—A case of bilateral papillœdema and ring scotoma due to sphenoidal sinusitis. *Lancet*, 24th September, 1910.

(8) Grönholm, V.—An affection of the chiasma caused by empyema of the posterior ethmoidal cells and of the sphenoidal sinus with a possibility of localising the site of the lesion within the chiasma. (Durch hintere Ethmoidalzeller und Keilbeinhölenempyem bedingte Chiasma-Affection mit Möglichkeit, den Sitz der Läsion innerhalb des Chiasma zu bestimmen.) *Zeitschrift für Augenheilkunde*, Oktober, 1910.

(9) Birch-Hirschfeld.—The changes in the optic nerve in orbital disease. (Die Veränderungen des Sehnerven bei Orbitalerkrankungen.) *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1910.

(10) De Ridder and Jauquet.—Double polysinusitis with ocular orbital endocranial and pharyngeal complications. (Polysinusite double avec complications oculaires, orbitaires, endocraniennes et pharyngée.) *Ann. d'Oculistique*, février, 1911.

(11) Dowling, J. Ivimey.—The relation of the anterior ethmoid region to diseases of the eye. *Ophthalmology*, April, 1911.

(12) Reber, Wendell.—Differential diagnosis of orbital affections occasioned by sinusitis, including report of a case of thrombosis of the cavernous sinus. *Ophthalmology*, April, 1911.

(13) Freudenthal, Wolff.—Exophthalmos due to empyema of ethmoid cells. *American Medicine*, May, 1911.

(14) Freudenthal, Wolff.—Blindness due to empyema of the sphenoidal sinus. *American Medicine*, May, 1911.

(15) Glegg, Wilfred.—Mucocele of the frontal sinus. *Birmingham Medical Review*, 15th August, 1911.

(16) Foster, John R.—Note on a case of acute antrum of Highmore with eye complications. *Lancet*, 14th October, 1911.

(17) Axenfeld, Th.—The treatment of orbital mucoceles, especially the endonasal treatment of mucocele of the ethmoid bone and of the lacrymal sac. (Die Behandlung der orbitalen Mucocelen, besonders die endonasale Therapie des Mucocelen des Siebbeins und des Tranensacks.) *Klin. Monatsbl. f. Augenheilk.*, Oktober, 1911.

(1) The case reported by **Krauss**, of Philadelphia, is fairly typical of the general run of cases of blindness due to accessory sinus disease on one side only—namely, a fairly sudden loss of vision, with the subjective and objective symptoms of a retro-ocular neuritis. In this case, besides the usual relative scotoma at the fixation point, there were an absolute scotoma surrounding it, and a further relative scotoma adjoining this and extending in a down and out direction to the 15° line.

There was marked contraction of the field of the affected eye (the right), and the left field was also slightly contracted. Tenderness to pressure developed on the right upper and inner orbital wall, and intranasal treatment was instituted, with the result that pus was discharged from the middle meatus, and a slight improvement in vision took place. Finally, operative measures were resorted to, these including resection of the septum, which was deviated to the right side, the removal of most of the right middle turbinate, and the clearing out of the affected anterior and posterior ethmoidal cells. The ocular symptoms rapidly abated after this; in a month R.V. (corrected) was 5/6, and seven months after it was 5/5.

Incidentally, in his paper, Krauss gives reasons for supposing that in such a case as this the optic nerve is affected by a toxic absorption rather than by an acute inflammatory process. T. E. ASHDOWN CARR.

(3) It is most important that the distinction between subperiosteal abscess, on the one hand, and of retrobulbar abscess and orbital phlegmon, on the other, should be well understood, especially as both groups are frequently confused in literature. This paper by **Birch-Hirschfeld**, of Leipzig, refers to a boy of six years, who developed a malignant type of retrobulbar phlegmon in connection with a contusion of the eyeball. Incisions and drainage did not suffice, and exenteration of the orbital contents had to be performed, which, in conjunction with collargol, proved successful. A subperiosteal abscess, of course, requires essentially different treatment, *viz.*, exposure of the orbital margin and removal of the periosteum without interference with the orbital contents. The condition of the optic nerve was interesting: it showed swelling of the intraocular portion and rupture of some fascicles due to the displacement of the optic, a causation of the nervous complications which has not been hitherto proved anatomically, although its possibility has been frequently alluded to. There was no inflammation or thrombosis within the optic nerve. R. GRUBER.

(4) The cases reported by **Fullerton**, of Glasgow, however interesting from the rhinological standpoint, seem to be somewhat incomplete from the point of view of the oculist, or else the title of the paper is misleading. Three cases are reported.—In the first there was optic neuritis; in the second no eye symptoms are mentioned; while in the third the eye report is confined to a statement of the existence of proptosis and of the visual acuity. The first case was one of mucocele of the right ethmoidal region, causing optic neuritis. With regard to the production of the optic neuritis, the author says, "the skull in this case was of the brachycephalic type. It is conceivable that the shape of the skull may have influenced the contour and relationship of the sphenoidal and ethmoid bones, so as to predispose the optic foramen to pressure from dilatation of the posterior ethmoidal cells." The eye report states the presence of proptosis and optic neuritis in the right eye before operation *via* the nose, and its disappearance (nearly) a week after operation, but does not give the visual acuity at this time. Prior to operation, it had been 5/10. ERNEST THOMSON.

(5) The careful and lengthened account by **Truc** and **Lemoine**, of Montpellier, of a case of frontal sinus mucocele in a woman of advanced age is hardly suitable for abstract. A bibliography on the subject accompanies the article, which may be referred to by those interested in this rare condition.

ERNEST THOMSON.

(6) **Schirmer** describes two cases of retrobulbar neuritis, one associated with lacrymal phlegmon, chemosis, swelling of the lids, and exophthalmos caused by an acute suppuration in the anterior ethmoidal cells, the second arising from disease of the posterior ethmoidal group. Immediate operation resulted in almost complete restoration of the vision in the first place, and similar treatment led to partial cure in the second. T. HARRISON BUTLER.

(7) Apart from the occurrence of ring scotoma as part of the perimetric evidence of the papillœdema, a peculiarity upon which the authors advance no special views, the interest of the case reported by **Wood**, of Shrewsbury, and

Wallis, of Aldershot, lies in the fact that double optic neuritis was here a symptom, not of intracranial disease, but of disease of the sphenoidal sinuses. The history dated from 1906, when the patient, a healthy woman, aged 29 years, was seized with sudden and severe frontal headache. The headache continued with periods of remission until the end of 1908, when it suddenly ceased. Following the period of headaches, and overlapping it to some extent, came a period in which the patient noticed visual defects, at first of the left eye, which remained defective prior to coming under treatment, then of the right eye, which however improved greatly, relapsed, and improved again.

When the patient first attended the Shropshire Eye, Ear, and Throat Hospital, in September, 1909, R.V.=6/9, L.V.=hand movements. There was œdema of both discs, but no hæmorrhages. She was afterwards admitted to hospital, and as the result of modified Burnham treatment for twelve days, V.R.=6/6, V.L.=6/36. At this time the sinuses do not seem to have come under suspicion. The patient was admitted again in January, 1910, with R.V.=6/9, L.V.=p.l. in the temporal field only, slight tenderness on backward pressure of the globes, pupils normal (except that the Wernicke hemiopic reflex was obtainable in the left eye), media clear, papillœdema R.+3D. L.+4D., arteries thread-like, veins engorged, slight retinal œdema, but no hæmorrhages. Fields of vision—R. marked contraction for white and red (especially inferiorily), extreme concentric contraction for green, but no central scotoma, L. p.l. in temporal field. The nose was now carefully examined, and mainly by a process of exclusion, the sphenoidal sinus was judged to be the cause of the nasal appearances. The middle tubinals were removed, and some days later both sphenoidal sinuses were opened and muco-pus was found. In course of time the vision came up to R. 6/5, L. 6/9·3, and the fields greatly improved, the central scotoma of the left having disappeared, but they retained the same characters as before, namely, the right contracted especially below, the left contracted and presenting a ring scotoma now that the central vision had returned.

The authors remark that the history of sudden blindness with frontal headache in a previously healthy person and the remittent character of the symptoms are very suggestive of accessory sinus affection. Yet the patient in this case absolutely denied any nasal discharge. The absence of any nervous symptoms negatived a cerebral origin. Leukæmia, anæmia, nephritis, plumbism, syphilis, were readily excluded. The frontal and antral sinuses transilluminated well, and thus finally pus was found in the sphenoidal sinuses. The temporary improvement which took place as the result of the modified Burnham treatment resulted, the authors suppose, from the relief of congestion of the mucosa around the ostium and the consequent escape of pus.

(A summary of the Burnham treatment will be found in THE OPHTHALMOSCOPE for 1906, p. 656.) ERNEST THOMSON.

(8) **Grönholm**, of Helsingfors, devotes this paper to the description of a remarkable case which reminds us of that by Glegg and Hay (*Archive für Laryngol. und Rhinolog.*, Bd. XVII, 1905, S. 525)

A man, aged 26 years, contracted a cold. This was followed by headache. Then, he noticed that the sight of his right eye was failing. Examination showed V.R. = 5/15. Emmetropia. Complete temporal hemianopsia on the right side with amblyopia extending from the vertical line bounding the hemianopic area, up to another vertical line which included the fixation point. The left eye had no area of blindness, but the temporal half of the field was amblyopic. The amblyopic area did not include the fixation point.

Grönholm watched the case for several weeks. After a fortnight, the nasal side of the right field showed partial amblyopia for colours. At the end of six weeks, the nasal field of the right eye became normal again, and on the left side the temporal hemiamblyopia was diminishing. The clearing up spread from below upwards. Later, the amblyopia section was narrowed to a wedge with its base towards the periphery and its apex near the fixation point.

A month later, the right temporal hemianopia was still complete. Hemiamblyopia was again present on the left side and an absolute scotoma was detected. The optic discs began now to appear atrophic. The hemianopic pupil reaction was obtained with Hess' apparatus. At this stage (why not weeks sooner?) the patient was sent over to Rhinological Clinic and Professor Af Forselles evacuated a large abscess in the right posterior ethmoid cells. No improvement of the condition of the vision followed this belated operation, but the patient lost his feeling of cerebral oppression.

The paper is illustrated with charts which show the condition of the visual fields as atrophy progressed.

The author finally discusses the probable seat of the lesion in the chiasma, basing his views upon Rönne's account of the position of the fibres in the chiasma as published in his book *Anatomiske, patholog. og klinische Undersogelser over alkololisk intoxications amblyopi*, *Klobenhavn*, 1910.

T. HARRISON BUTLER.

(9) At the first sitting of the Heidelberg Ophthalmological Society, presided over by Sir H. R. Swanzy, **Birch-Hirschfeld**, of Leipzig, described his examination of the optic nerve in five cases of orbital disease. The first was one of orbital phlegmon following empyema of the ethmoid cells. The patient died of cerebral abscess, but not before the fundus had been examined and found normal. The orbit was infiltrated with leucocytes and lymphocytes, especially in its posterior part. The anterior part was markedly œdematous. The optic nerve was greatly stretched by the exophthalmos. The nerve fibres were slightly separated by œdema, and between them was a small-celled infiltration. There were no degenerative changes.

The second case was a thrombophlebitis caused by direct injury. The orbital tissues were riddled with abscesses, but the nerve was free from inflammation. It was, however, sharply bent by pressure and pressed against the sclera. The central vessels were consequently much narrowed, and at the sharpest part of the bend many nerve bundles were torn and full of vacuoles.

The third case was one of tuberculosis of the optic nerve spreading from the orbit. The nerve bundles had entirely disappeared in the upper third of the nerve, and were replaced by connective tissue.

The last two cases deal with carcinoma of the orbit, in one case spreading from the ethmoid cells, and in the other secondary to mammary cancer.

T. HARRISON BUTLER.

(10) **De Ridder** and **Jauquet** record the case of a man with purulent disease of the sinuses, including the sphenoid, causing in the right eye œdema of the lids, chemosis, proptosis, and milky infiltration of the cornea with loss of sensation, and on the left side some papillitis. There was a purulent fistula under the right lower lid, with pus and polypi in the middle and superior meati on both sides of the nose, and a collection of pus beneath the right lateral wall of the pharynx and neighbouring part of the velum palati. All the sinuses on the right side were opened and cleansed. During this operation the patient had a couple of attacks of syncope with arrest of respiration, and treatment of the left side with possible trephining were therefore postponed. Half-an-hour after the operation the patient had another attack of syncope, of which he died. At the autopsy next day, the following conditions were

found.—Purulent basal meningitis, most marked on the right side with pus breaking through the foramen ovale, and also passing underneath the enlarged pituitary body into the lateral sinuses, which were both thrombosed and full of pus, and subperiosteal necrosis in the middle fossa but no perforation of the bone in the operative region.

The authors urge the importance of early diagnosis in cases of sinus disease, and the necessity for prompt action in neglected cases such as the one they record. R. J. COULTER.

(11) **Dowling** reports in detail ten cases to demonstrate that the anterior ethmoid region is an important factor in the causation of ocular diseases. In these cases such symptoms as asthenopia, conjunctival congestion, epiphora, tenderness of the lacrymal gland, corneal ulcers, recurrent iritis, and glaucoma, were cured or relieved by the removal of the anterior part of the middle turbinals and drainage of the ethmoid cells. In all the cases treatment of errors of refraction by glasses had been of no avail.

A. J. BALLANTYNE.

(12) The frequency with which orbital disease is associated with disease of the sinuses is explained by the intimate relationship of these two regions maintained through veins and lymphatics. **Reber,** of Philadelphia, divides the orbital complications into inflammatory and non-inflammatory. To the first group belongs œdema of the eyelids, often transient and recurrent, and apt to be confused with angio-neurotic œdema. Other conditions of a non-inflammatory kind are, a low-grade periostitis with deformity of the orbital contour, and mucocele of the ethmoid or frontal sinus invading the orbit and disturbing the position of the eyeball. Ocular palsies may accompany either acute or chronic forms of sinusitis, but most often the former. The orbital conditions due to inflammatory sinus disease include periostitis, optic nerve disorders, orbital cellulitis, orbital abscess, brain abscess, and thrombosis of the cavernous sinus. Optic nerve trouble, usually a retro-bulbar neuritis, is most often associated with disease of the sphenoidal or posterior ethmoidal cells. It is evidenced by central scotoma, diminution of the light sense, and pain on moving the eyeball. The unilateral nature of the affection is strongly suggestive. Orbital cellulitis frequently arises by extension or metastasis from the sinuses. It may subside, or it may go on to orbital abscess. Acute orbital cellulitis may simulate thrombosis of the cavernous sinus. Chronic orbital abscess may be confounded with orbital tumour.

The case reported by Reber is one of double cavernous sinus thrombosis, sudden in onset and rapidly fatal, in a woman aged 52 years, two weeks after the onset of a *grippe*-like attack, complicated with suppurative tonsillitis. In the discussion of his case the author favours the view that the condition arose from disease of one of the accessory sinuses, although the tonsillitis may have been the starting point.

He emphasises the importance of opening and treating the sinuses in many cases of orbital disease, and agrees with Jackson that more reliance should be placed on a certain clinical association of symptoms, rather than on the result of rhinological examination, which may be negative even in the presence of sinus disease. A. J. BALLANTYNE.

(13) After a "cold," a man, 45 years of age, developed a swelling at the inner canthus of one eye and protrusion of the corresponding eye. Part of the middle turbinated body on the affected side was removed by **Freudenthal,** of New York, and one ethmoidal sinus was opened with negative result. A quantity of pus, however, was liberated from the third cell, and after that also from the frontal sinus. Good recovery ultimately.

SYDNEY STEPHENSON.

(15) In the case reported by **Glegg**, of Birmingham (referred to him from the Eye Hospital by H. Eales) the right eye was displaced downwards, forwards, and slightly outwards. There was a tense fluctuating swelling between the orbital roof and the eyeball on the inner side. The skin was normal in appearance, and there was no pain or tenderness to pressure. There was diplopia in both vertical and horizontal planes, but no ocular paralysis. The right nasal cavity showed a trace of pus in the middle meatus and the anterior end of the right middle turbinal was enlarged. When the incision was made for opening the frontal sinus, a thick mucoid substance oozed up, and could be lifted up intact with the handle of a scalpel. An opening was found in the bone at the junction of the inner and middle third of the orbital roof. The sinus cavity was full of tenacious secretion. When this had been cleaned out with lint soaked in peroxide of hydrogen, the lining of the sinus was found not to be swollen and had none of the appearances associated with chronic suppuration. It was not curetted. The anterior end of the right middle turbinal was removed and an opening made from above downwards into the nose, through which the cavity was drained. The eye gradually returned to its normal position, and the swelling subsided. The secretion contained two kinds of cocci. One was a streptococcus but was not an ordinary s. pyogenes. The other was a diplococcus resembling one the pathologist (C. J. Lewis) had previously isolated in another case of frontal mucocele and found to be non-pathogenic. ERNEST THOMSON.

(16) By puncturing the antrum of Highmore, **Foster**, of West Hartlepool, relieved diplopia, deviation of the eyeball, and ? optic papillitis in a man of 22 years. The condition had followed severe influenza a fortnight before he was examined by Foster. SYDNEY STEPHENSON.

(17) The cases dealt with in this highly instructive paper by **Axenfeld**, of Freiburg im B., are examples of those large chronic mucoceles which, owing to their interference with the eye, bring the patient in the first place to the ophthalmic surgeon. Although the author has always advocated the treatment of orbital complications of sinus disease, and even of the accompanying sinus disease, by the ophthalmic surgeon, there are certain cases which he prefers to hand over to the rhinologist, because better results can be obtained by endonasal treatment. The fact that nasal symptoms are often absent in cases of large, indolent, mucocele of the orbit, owing to closure of the ostium of the affected sinus, tempts the ophthalmologist to attack the orbital swelling from the front, but Axenfeld is not sure that this is always right. Of his three cases of ethmoidal mucocele, two were operated on endonasally, by the rhinologist, and one from the front, by himself. The former gave the better resuts. Operation by the orbital route is apt to result in a depressed cicatrix, and interference with the trochlea.

In the case of the frontal sinus, if the anterior and posterior walls are still firm, endonasal treatment will not be sucessful. The mucocele must be opened from the front, and the anterior wall and floor removed. A plate of bone should be preserved to prevent the disfigurement of a depressed cicatrix. If the anterior wall is thin and yielding, the endonasal opening should be tried, and if that is unsuccessful, the radical operation. The latter is also indicated if the mucocele is accompanied by an osteoma of the sinus (to be detected by the X-rays).

The paper concludes with an account of a case of mucocele of the lacrymal sac treated endonasally. The superficial aspect of the tumour measured five millimetres vertically, and three in width, and it passed deeply into the orbit, displacing the eye outwards and forwards. Pressure on the swelling caused the expulsion into the nose of a fœtid greenish discharge, and produced a bulging of the outer wall of the nose, showing that the inner bony wall of the sac was gone. Killian operated endonasally, opening a large window. Some of the sac wall was removed, and the cavity swabbed out with peroxide of hydrogen. There was rapid disappearance of the swelling, with return of the eye to its normal position. A. J. BALLANTYNE.

XI.—REMEDIES.

(SIXTH NOTICE).

(1) **Carpenter, E. R.**—A preliminary report on the treatment of scleritis and pterygium. *Ophthalmic Record*, March, 1911.

(2) **Schoull.**—Hectine and hectargyre in the treatment of syphilis. (L'hectine et l'hectargyre dans le traitement de la syphilis.) *L'Ophtalmologie Provinciale*, septembre, 1911.

(3) **Dransart.**—Notes on the abortive treatment of incipient cataract by medicine. (Notes sur le traitement médical abortif de la cataracte commencante.) *L'Ophtalmologie Provinciale*, octobre, 1911.

(4) **Liebermann and Lengyel.**—On the destruction of pathogenic bacteria in the conjunctiva with the object of prophylaxis in cataract operations. (Die Vernichtung der pathogenen Bindehautbakterien zum Zweck der Prophylaxe bei Kateraktoperationen.) *Zeitschrift für Augenheilkunde*, Dezember, 1911.

(5) **Flemming and Krusius.**—The action of "radiant energy" upon experimental tuberculosis of the eye. (Zur Einwirkung "strahlender Energie" auf die experimentelle Tuberculose des Auges.) *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1911, S. 10.

(6) **Smith, Capt. F. F. Strother.**—Treatment of trachomatous conditions by sub-conjunctival injections of cyanide of mercury. *Indian Medical Gazette*, Vol. XLVII, p. 102, March, 1912.

(7) **Kuhnt, H.**—On the treatment of corneal ulceration in severe Basedow's disease. (Zur Behandlung der Hornhautulzeration bei hochgradigen Basedow-Exophthalmos.) *Zeitschrift für Augenheilkunde*, April, 1912.

(8) **Koll, A.**—The treatment of eczematous skin inflammations in ophthalmic patients with oscillated hot air (Hot air douch). [Die Behandlung der ekzematösen Hautentzündungen bei Augenkranken mit bewegter heisser Luft (Heissluftdusche).] *Zeitschrift für Augenheilkunde*, April, 1912.

(9) **Wray, Charles.**—Points in the treatment of corneal ulcers. *Ophthalmic Record*, May, 1912.

(10) **Brailey, W. H.**—A new cell proliferant. *Trans. Ophth. Society U.K.*, Vol. XXXII, Fasc. 2, 1912, p. 214.

(1) **Carpenter**, of El Paso, Texas, recommends the subconjunctival injection of pure tincture of iodine over the region involved by scleritis and episcleritis The reaction is marked, and he uses an injection of 5 per cent. solution of

cocaine before the iodine and continuous ice applications for several hours afterwards. No sloughing occurs, and but little pain is experienced. All regions involved were cured at the end of a week or ten days. In two of the cases he noted the disappearance of a small pterygium after the iodine injection.

J. JAMESON EVANS.

(2) **Schoull**, of Nice, records eight cases, the majority of them treated with "hectine" and "hectargyre;" he is of the opinion that Salvarsan is not as safe as those remedies. The latter drug has been responsible for many accidents, *e.g.*, epilepsy, albuminuria, abortion, relapses, etc. He recommends the following mode of administration: intramuscular injections of 10 centigrammes of hectine or hectargyre to commence with; then a rest of ten days, followed by 20 centigrammes of either drug. The only inconvenience experienced was with hectargyre, which produced a stomatitis. None of the author's cases were tested with the Wassermann test.

P. A. HARRY.

(3) **Dransart**, of Somain, mentions an article, by Louis Dor, in *La Clinique Ophtalmologique* on this subject. Fifty cases were treated, and 80 per cent. of the results were good. Dor used equal parts of potassium iodide and calcium chloride, also an ointment of resorcin and lanoline. His idea was to combat the action of the ferment producing the cataract. Verdereau carries out the same suggestion, but in the form of subconjunctival injections. Dransart renounces the latter on account of the pain they cause. This line of treatment was suggested, more than ten years ago, by Badal. In Germany, Römer and v. Pflügk have recorded favourable results. In America, Bernard and Kobroy in *The American Journal of Ophthalmology*, May, 1909, published an article on the medicinal treatment of cataract by potassium thiosinamate.

Dransart thinks that the *rationale* of the treatment is to combat the effects of the accumulation of ammonia in the blood, which causes cataract and other troubles by the precipitation of calcareous salts. He has discovered as prodromal symptoms a diminished secretion of urine and attacks of headache. The greater the error of refraction and the difficulties of accommodation, the more rapid is the progress of the opacity. He recommends general treatment, as well as high frequency currents, baths, etc. P. A. HARRY.

(4) **Liebermann** and **Lengyel**, of Budapest, find that practical sterility of the conjunctival sac can be attained by frequent *lavage* with a 1 : 10,000 solution of oxycyanide of mercury. In the small percentage of cases where this method fails, a single application of a 2 per cent. solution of silver nitrate will often attain the desired object. T. HARRISON BUTLER.

(5) By **Flemming** and **Krusius**, of Berlin, experimental tuberculosis of the eye was induced by inoculation with a determined amount of a dried bouillon culture dissolved in normal saline. It was found by careful experiments that perforation took place with almost mathematical certainty at a definite time after inoculation. The radiant energy was derived from radium, from mesothorium, and from the sun. Exposure to sun was made at Berlin, at the normal level and also in a balloon. The first series of experiments was made upon the bacilli before inoculation. Radium and thorium attenuated the bacilli, and perforation was delayed. Sunlight, at normal level, acting for fifteen minutes, doubled the time to perforation; longer than half an hour killed the bacilli. Less than five minutes' exposure in the balloon absolutely killed the organisms.

The second series related to the action of radiant energy upon the tissues before inoculation took place. In this case the time of perforation was deferred.

The third series of animals were exposed immediately after inoculation during the stage of incubation. In all cases perforation was deferred.

In the final series the exposures were not made until the disease was well established. Here, again, perforation took place at a later date than in control animals.

The much more intense action of sunlight high in the atmosphere is very remarkable. T. HARRISON BUTLER.

(6) It will be remembered that in 1909, Major Henry Smith, of Jullundur, recommended the use of sub-conjunctival injections of cyanide of mercury, more particularly for trachomatous pannus (THE OPHTHALMOSCOPE, Vol. VII, p. 636). Major Elliot, of Madras, last year reported adversely on the method after a short trial (THE OPHTHALMOSCOPE, Vol. IX, p. 873).

Captain Strother Smith has worked under Major Smith at Jullundur, and now gives his experience in support of the treatment. He states that since he adopted the method over 1,500 cases of trachoma have passed through his hands. The milder cases, however, are treated by one or more applications of silver nitrate solution, 60 grains to the ounce, to the palpebral conjunctiva. The silver nitrate is afterwards neutralised by salt solution. All the severer cases of trachoma, with or without pannus, are reserved for the cyanide injections—20 minims of 1 in 4,000 solution under the bulbar conjunctiva in the upper fornix.

Some of Captain Smith's statements are open to criticism—for instance, the following: "If we get the disease early, that is, within the first week of the beginning of the disease, one injection will completely clear up the pannus." In some cases as many as four injections are given at intervals of six or seven days. The method is advocated also for corneal ulceration, trachomatous or otherwise, for corneal leucomata, interstitial keratitis, and retro-bulbar neuritis. The author has never seen any ill effects from the injections. H. HERBERT.

(7) **Kuhnt**, of Bonn, first discusses an operation for the relief of severe exophthalmos in Graves' disease carried out by Julius Dollinger at Budapest. Dollinger cut down upon the outer orbital wall and resected it with chisel and mallet and with bone forceps. This procedure Kuhnt considers to be unnecessarily severe; it should be performed only as a last resort when other methods have failed. He advises a canthoplasty, combined with a separation of the fibres of the external palpebral ligament. In very severe cases he tries to lengthen the upper lid and to weaken the levator palpebræ superioris.

The paper is not illustrated, and it is really almost impossible to grasp all the details of Kuhnt's operation, still less to present them in an abstract. T. HARRISON BUTLER.

(8) **Koll**, of Elberfelt, in a short but practical paper, recounts his successful use of the hot air douch in cases of weeping eczema behind the ears, impetigo, atropine dermatitis, and similar conditions. He uses the ordinary electric hot air douch, and moves it about to prevent burning. His results have been most gratifying. T. HARRISON BUTLER.

(9) **Wray**, of London, pleads for broader investigation into the causes of corneal ulceration, so that more rational and successful prophylactic and curative measures can be adopted. Mechanical causes of ulceration should be looked for; the lacrymal passages should be examined thoroughly; due attention should be given to the excretory organs; and care should be taken that the eyes are not infected by the excreta. The mouth may also be a source of infection, and one of the first rules in the treatment of corneal ulcer should be "the eyes never to be touched with unwashed hands." As a rule, Wray uses normal saline in preference to antiseptic lotions, and he

finds that 5 per cent. solution of argyrol is sometimes more efficient than solution three or four times as strong. He recommended a diet of bread and milk, and, once a day, freely minced underdone meat with grated toast.

J. JAMESON EVANS.

(10) W. H. Brailey, of London, has employed a saturated (0·6 per cent.) aqueous solution of allontoin, derived from the common comfrey, in a few cases of chronic ulcer of the cornea and of interstitial keratitis. His experiences, upon the whole, have been favourable. Allontoin is not a bactericide. SYDNEY STEPHENSON.

XII.—MISCELLANEOUS.

(1) Nettleship, E.—Extensive congenital opacity of retina in yellow spot region of both eyes. Opaque nerve fibres. High myopia also probably congenital. Case under notice fifteen years. *Royal London Ophthalmic Hospital Reports*, Vol. XVI, Part 4.

(2) Bouchart.—The leucomata of Tobias according to the Latin thesis of Ch. D. Brecht, 1743. (Les Leucomes de Tobie d'après la thèse latine de Ch. D. Brecht, 1743.) *L'Ophtalmologie Provinciale*, T. III, p. 181.

(3) Culbertson.—Are faulty orbital developments which cause heterophoria the result of adenoids? *American Journal of Ophthalmology*, December, 1908.

(4) Harman, N. Bishop.—Sore eyelids. *Clinical Journal*, 20th January, 1909.

(5) Pergens, Ed.—On the history of the anatomical model eye and schematic eyes for optical determinations. (Zur Geschichte der anatomischen Augenmodelle und der schematischen Augen zu optischen Berechnungen.) *Janus*, 1909.

(6) Roper, Arthur C.—Common mistakes in ophthalmic practice *British Medical Journal*, 20th March, 1909.

(7) Henderson, E. E.—The diagnosis and treatment of some common inflammatory affections of the eye from the standpoint of the general practitioner. *British Medical Journal*, 22nd May, 1909.

(8) Berger, E.—Visual disturbance due to the use of hair dye containing anilin. *Archives of Ophthalmology*, July, 1909.

(9) Thomson, Hugh.—Some pitfalls in the diagnosis of common diseases of the eye. *Clinical Journal*, August, 1910.

(10) Meyerhof, M.—Some newly-discovered manuscripts of Arabic oculists. (Einige neuere Funde von Handschriften arabischer Augenärzte). *Centralbl. f. prak. Augenheilkunde*, November, 1909.

(11) Cross, Francis Richardson.—The brain structures concerned in vision. *Lancet*, 18th December, 1909.

(12) Koyle, F. H.—Certain diseases of the eye which the general practitioner should know. *New York State Journ. of Medicine*, December, 1909.

(13) Hepburn, Malcolm.—The choroidal blood supply of the retina, *Royal London Ophthalmic Hospital Reports*, January, 1910.

(14) Dianoux.—Cysticercus and male fern. (Cysticerques et fougère mâle.) *La Clinique Ophtalmologique*, 10 janvier, 1910.

(15) Sym, William George.—The influence upon vision of the increasing yellow colouration of the lens. *Edinburgh Medical Journal*, June, 1910.

(16) Hirschberg, J.—On a plagiarised text-book of ophthalmology. An historical investigation. *Ophthalmology*, July, 1910.

(17) Oppenheimer, E. H.—Marine medicine and ophthalmology. (Schiffs- und Augenärztliches.) *Wochenschrift f. Therapie u. Hygiene des Auges*, 11 August, 1910.

(18) Brunetière and Aubaret.—On the variations in the static refraction in glaucoma. (Les variations de la réfraction statique chez les glaucomateux.) *Ann. d'Oculistique*, septembre, 1910, and *Bull. et Mém. de la Société Française d'Ophtalmologie*, T. XXVII, 1910, p. 344.

(19) Oswald, Agnes.—Hereditary tendency to defective sight in males only of a family. *British Medical Journal*, 7th January, 1911.

(20) Henschen, S. E.—On circumscribed nutritive districts in the occipital lobe and their importance in relation to the theory of the visual centrum. (Ueber circumscripte Nutritionsgebiete im Occipitallappen und ihre Bedeutung für die Lehre vom Sehcentrum.) von Graefe's *Archiv f. Ophthalmologie*, Bd. LXXVIII, 1 Heft, 17 Januar, 1911.

(21) Magitot, E.—On the possible survival of the transparent cornea after prolonged preservation outside the organism (preliminary note). [Sur la survie possible de la cornée transparent après conservation prolongée en dehors de l'organisme (note préliminaire).] *Ann. d'Oculistique*, janvier, 1911.

(22) Bennett, H. Percy.—A few points on some common affections of the eye. *Brit. Med. Journal*, 8th April, 1911.

(23) Landolt, E.—On the correction of foreign words used in ophthalmology. (Zur Richtigstellung der in der Augenheilkunde gebrauchten Fremdwörter.) *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 8 August, 1911.

(1) This is a curious case occurring in a girl who was five years old when first seen. In each eye was an oval area in the retina, extending from the temporal side of the disc, up to, and somewhat beyond, the yellow spot region. It was opaque and white. The upper and lower border was well defined and so dense as to hide the choroid; the central part was thinner. Both eyes were myopic to the extent of about 20D. When the patient was about 17 years of age, some vacuoles and opacities were seen in the lens. Her vision became reduced to 4/60 and J.1 at three inches. She subsequently went to Germany as a teacher. She was independent in her habits and this led to her death by accident when 25 years of age.

The condition somewhat resembled opaque nerve fibres, but it was thought possible that the whole process may have started in the choroid in fœtal life, and have caused, not only the protrusion indicated by the myopia, but also secondary changes in the retina.

The family history did not throw any particular light on the case. A very pretty coloured ophthalmoscopic drawing of the condition of the fundus is given. C. DEVEREUX MARSHALL.

(3) **Culbertson** has noticed that a large number of children suffering from adenoids have heterophoric or strabismic errors, and suggests that this question should be investigated. ERNEST THOMSON.

(4) **Harman's** article on sore eyelids is a racily written description of blepharitis of the poor, and gouty conjunctivitis of the rich (to follow the writer's own classification). The symptoms, ætiology, and treatment are put forward in a common-sense style, and in plain language spiced with mild satire. "There may be no particular virtue in the water or the air of the spa; but in such places these (gouty) people rise early, get to bed early, and drink freely of a water, which, whatever else it may contain in salts, as the analysis will declare, contains H_2O in proper combination." ERNEST THOMSON.

(5) This short well-illustrated paper by **Pergens,** of Maeseyck, gives an interesting account of the subject from the Arabian representations down to the present time. T. HARRISON BUTLER.

(8) **Berger** reports a case in which an anilin dye had been used for the hair. A central positive scotoma ensued in one year. V. = 1/5. After disusing the dye, the scotoma disappeared in about three weeks, and vision returned to 1. ROSA FORD.

(9) **Hugh Thomson**, of London, refers to the grey lenses of senile individuals which are frequently mistaken for cataract. One is rightly urged not to inform patients with faint lenticular opacities that they have cataract. Photophobia in children is not always due to corneal ulcer. In some cases where the child refuses to show his eyes, it is wise to give an anæsthetic. Glaucoma and iritis are constantly mistaken by the careless and ignorant for conjunctivitis.
T. HARRISON BUTLER.

(11) **Cross'** admirable Bradshawe Lecture does not admit of useful abstraction on account of its wealth of anatomical detail.
ERNEST THOMSON.

(13) This paper contains a continuation of the researches of **Hepburn**, of London, on the question of the choroidal blood supply of the retina, previous papers by him having been published in the *Transactions of the Ophthalmological Society*, Vol. XXVIII, and the *R. L. O. H. Reports*, Vol. XVII. Under normal conditions the blood supply of the posterior layers of the retina, comprising the pigment layer and the layers of rods and cones is derived from the choroid, and the retinal vessels do not participate in the nourishment of the neuro-epithelium. If, however, anything interferes with the choroidal blood supply, there are reasons for thinking that its place may be taken by the retinal vessels and certain definite parts of the retina retain their vitality longer than certain other parts. Not only does the retina degenerate in sections, but cases are met with where the degeneration tends to occur in localised areas, and to remain confined to one particular region without showing any disposition to advance. The blood supply of the posterior layers of the retina can be divided into three main sections, *viz.:* the macula, the mid-periphery, and the extreme periphery, but these divisions apply only to that part of the retina which is visible ophthalmoscopically. The proofs of these facts rest entirely on clinical evidence, and at present detailed anatomical proof is entirely wanting, although the actual changes visible with the ophthalmoscope lend additional clinical support

to the views expressed, and a good many instructive visual fields are given illustrating this paper. C. DEVEREUX MARSHALL.

(14) **Dianoux's** (Nantes) patient was a man of 31 years, who in the course of many travels developed a complete taenia, *i.e.*, taenia with its sequelae, cysticerci of the skin, the eye, and the nerve centres. The vitreous contained a cysticercus. It was obviously such, although Dianoux had never seen one before. The cyst, situated at the temporal side, was implanted, like a mushroom, in the horizontal meridian. It was pearly grey, with orange-yellow edges. In its centre could be seen the cysticercus, and movements were observed. Later on, a nodule appeared in Scarpa's triangle, and the patient had epileptiform crises. Male fern dislodged from the bowel four or five metres of *taenia solium*. What to do as regards the eye became a serious question. Dianoux was puzzled. Then his colleague, Professor Rappin, recollected reading about the treatment of cysticercus by male fern. The article had been by Professor de Renzi, of Naples, and concerned the treatment of *echinococcus* cysts by extract of male fern. Acting on this hint, Dianoux, though haunted by the possibility of retrobulbar neuritis and optic atrophy, commenced a careful intermittent treatment, observing the condition of the good eye all the time. In all, 102 grammes of male fern extract were administered in 71 days, with numerous intervals. Treatment was commenced on 21st April. By 24th May the movements of the intraocular parasite had ceased and the cyst had become flattened. This continued through June, when, however, the cyst of the skin over Scarpa's triangle was discovered. Treatment had to be continued. The patient left the hospital on 15th November. An examination of the eye at this time showed that a retrospective diagnosis would have been impossible. "There is nothing but a cicatricial condition of the retina with vascularization at the point occupied by the vesicle which has now disappeared; the neighbouring region is the seat of a *retinitis proliferans* without special characters." The author admits the possibility of spontaneous cure, but the ordinary evolution of the scolex takes a much longer time; he considered that the case was really cured by the 17th June.

"Finally, the case does not stand alone. With the four cases of M. de Renzi an already compact group is formed." ERNEST THOMSON.

(15) **Sym's** three page article seems practically to be an abstract of a paper by Hess, of Würzburg, in *Archiv für Augenheilkunde*, Bd. LXIII, Heft 2.

ERNEST THOMSON.

(16) The text-book to which this essay refers is "*A Treatise on One Hundred and Eighteen Principal Diseases of the Eyes and Eyelids, etc., in which are communicated several new discoveries relative to the cure of defects in vision with many original prescriptions.* By William Rowley, M.D., Member of the University of Oxford, the Royal College of Physicians in London, etc., to which are added directions in the choice of spectacles. London, 1790."

Rowley was born at London in 1743. In 1761 he entered the navy as assistant to a ship's surgeon, voyaged to the West Indies and elsewhere, returned to London and seems to have settled there after becoming M.D. of St. Andrews, and Member of the Royal College of Physicians. He practised surgery, including cataract operations; founded St. John's Hospital for diseases of the eyes, legs, and breasts; taught anatomy; and was physician for internal diseases at the Hospital of St. Mary-le-Bone. He published a considerable number of treatises on surgery, gynæcology, pediatrics, psychiatry, and ophthalmology. The most important of his ophthalmological productions, previous to the one in question, was a treatise on the principal diseases of the eye, published in 1773. It was pointed out by R. Förster, of Breslau, in 1862, that Rowley's later Treatise on One Hundred and Eighteen

Principal Diseases, etc., which was stated to be an improved edition of that of 1773, was in reality almost a word for word translation of the "Doctrina de Morbis Oculorum," published by Jacob Plenk at Vienna in 1777. Both Plenk's Latin treatise and Rowley's English version were translated at a later date into German.

Hirschberg, of Berlin, discusses in detail this impudent plagiarism and at the same time points out the few additions, original and otherwise, which Rowley made to the work of Plenk. A. J. BALLANTYNE.

(17) In this short paper **Oppenheimer** relates some experiences as second medical officer on a liner to America. The advantages of a specialist in such a position he illustrates by a mastoid operation undertaken by a laryngologist on board, who received a gift of 10,000 dollars from the patient. This being the eighth trip, he says, he found nothing new during the short time he had ashore at New York. An early appearance of *mal de mer*, as headache, disappeared after lying down and sneezing. W. B. INGLIS POLLOCK.

(18) **Brunetière** and **Aubaret,** of Bordeaux, discuss the tendency of glaucomatous eyes to become less hypermetropic or more myopic and also to develop astigmatism against the rule. They conclude that these changes take place in glaucoma when it is left to itself or under any of the various methods of treatment, and without saying that the changes have any influence on the prognosis of the condition, they consider that they may supply valuable information as to the course of the disease, and by giving warning of the insidious start of a new attack, serve as indications for more vigorous treatment. Finally, they are inclined to believe that the multiple variations have a tendency to place the eye in a better condition to resist a fresh attack of glaucoma. R. J. COULTER.

(19) The family whose eye defect is reported by **Agnes Oswald**, of Dover, loses a good deal of its interest from the fact that the authoress of the report was not professionally concerned with it. In consequence, she is only able to speak of normal or abnormal sight as she was able to observe it, without systematic examination. The conditions named as having been observed are "myopia and strabismus," "myopia and nystagmus," "defective sight," and the conclusion is, that the history "seems to tell of a condition which is transmitted by both males and females of a family to the males only; and, leaving the mother and the maternal grandmother unaffected, has appeared again in the fourth generation." ERNEST THOMSON.

(20) **Henschen** maintains, against von Monakow, the possibility of nutritive disturbances affecting the cortex of the occipital lobe only, especially the district of the calcarine fissure, the site of the visual centre. In affections of the cortex in its whole depth, a thin layer of subcortical matter— about $\frac{1}{4}$ mm. to $\frac{1}{2}$ mm.—is, as a rule, also implicated, and escapes in isolated affection of the medulla generally. If the disturbance is extensive, of course both grey and white matter suffer. That the visual centre is exclusively localized in the cortex along the calcarine fissure can be proved both negatively, by lesions elsewhere never resulting in scotoma, and positively, by large lesions of this whole region producing complete hemiopia and small ones analogous scotoma. Henschen also maintains the isolated representation of the macular region in the occipital cortex in opposition to von Monakow and Bernheimer.

R. GRUBER.

(21) **E. Magitot** finds that if rabbits' eyes are removed as cleanly as possible, washed in distilled water, followed by Lock's solution, and kept in rabbits' serum at a temperature of between 0° and 4° C., their cornea and media remain transparent for from ten to twelve days. Pieces of the corneæ of eyes preserved in this manner were transplanted into the corneæ of living rabbits

and became organically united with them, retaining their transparency, thus showing that they were in a state of latent vitality. R. J. COULTER.

(22) This article by **Bennett**, of Newcastle-on-Tyne, contains many hints likely to be of service to the general practitioner, but less suited to readers of THE OPHTHALMOSCOPE. His statement, however, that the number of cases of ophthalmia neonatorum seen within the last few years at the local eye infirmary has markedly decreased, is of interest in view of the different opinions held by equally competent observers with regard to the point.

SYDNEY STEPHENSON.

(23) **Landolt**, of Paris, drew attention to the loose manner in which Greek and Latin words were used in ophthalmology, and suggested that an international commission be appointed to examine and correct our vocabulary.

T. HARRISON BUTLER.

BOOK NOTICE.

Diseases of the Eye: a Manual for Students and Practitioners. By J. HERBERT PARSONS. Second Edition. London: J. & A. Churchill. 1912. Price 12s. 6d. net.

In this manual for students and practitioners, now in its second edition, there is internal evidence that the book is not intended for the specialist. Some of the chapters, notably that on operations on the eyeball, are insufficiently developed to be of much service to him. Yet the opinion may be hazarded that a more freshly-written and stimulating book on eye diseases has never been produced for the edification of the student of medicine. It is true that Mr. Parsons is at times rather dogmatic, and equally true that a sentence here and there stands in need of revision, but there is a peculiar directness in the writing and a crispness of view which are the result, we suppose, of the sound pathological foundation upon which the book is constructed. One feels all through that compilation is at a minimum, and that most of the statements made are the product of clinical observation and pathological knowledge. In places where the author disagrees with the standard practice he indicates the fact quite clearly.

The thirty-one chapters are arranged in six sections. There are three appendices. The sections are anatomy and physiology, examination of the eye, diseases of the eye, errors of refraction, disorders of motility, and diseases of the adnexa. The appendices are: I. Preliminary examination of the patient; II. Therapeutic notes; III. Requirements for the public services. We are not sure of the wisdom of separating so widely the chapters on optics and physiological optics, and on ophthalmoscopic examination and functional examination, from those on retinoscopy, errors of refraction, and anomalies of accommodation. When, for instance, the student reaches Chapter XXIII, on retinoscopy, page 496, he is told to go back and read Chapters III, IV, VII, and IX.

The volume is enriched with a number of coloured plates inserted in their proper places. All of these are good, and some reach the highest standard of excellence. There are several realistic photomicrographs of micro-organisms. Inside the back cover are samples of test wools, including Abney's two extra skeins, purple and yellow.

The author, perhaps wisely, relegates serum and vaccine treatment to the trained bacteriologist; consequently, the details of tuberculin treatment are not discussed. Thus, on page 210 we are told that "injections of the latest form of tuberculin have given encouraging results," not, it must be confessed, a very informative statement. The word "tuberculin" has escaped the attention of the index-maker.

There is so much originality throughout this manual that it is difficult to single out portions for special commendation We certainly think that one of the most useful sections to the student will be section I. This deals with anatomy, physiology, elementary optics, and the neurology of vision. A book written for students of ophthalmology ought, in our opinion, and contrary to frequent practice, to contain such a preamble.

A few criticisms are, of course, inevitable. In the chapter on glaucoma, one cannot help thinking that the absence of all mention of tonometry is an error of judgment, and that the author has been rather shabby in his reference to the substitute operations for iridectomy. On the other hand, the description of secondary glaucoma before that of primary is a very sound idea.

In the chapter on symptomatic disturbances of vision we cannot find any reference to amblyopia in traumatic neurosis, a subject upon which the general practitioner might well seek information in this text-book. In the same chapter the remark "Holmgren's wools are used by the Board of Trade, &c., and are sufficiently good," is pretty certain to lead to criticism.

Although one may agree with the spirit, one cannot admire the actual wording of the last sentence of the chapter on retinoscopy:—"A vast number of refractions should have been carefully corrected and confirmed by subjective tests before a surgeon should consider himself justified in ordering glasses without supervision from an expert." Nor do we like the assumption of certainty of result which is implied in this sentence:—"It (operation for alternating strabismus) should be postponed until a perfect result can be guaranteed, *i.e.*, until the operation can be performed with local anæsthesia."

The following sentence about exophthalmos, baffled the reviewer for some time:—"The patient is seated, the surgeon standing behind him. The surgeon holds the patient's head in such a manner that he looks straight down the nose. He then rotates the head backwards until he can just see the apex of one cornea. If he can see more of the other cornea, that eye is relatively proptosed."

On page 650, the author seems to be describing two different methods of exenteration of the orbit, (with, and without, inclusion of the lids) at the same moment, and in the end fails to state how the incisions are to be made when the lids are to be retained.

Typographical errors are few and not important. On page 89, a little further explanation of the figures seems to be necessary, and on page 531, the right hand figure is not quite in accordance with the description under it.

Print, paper, and binding are all that can be desired. We feel sure that this second edition of Parsons' *Manual* will find its way into the libraries of many students—and it deserves to do so. ERNEST THOMSON.

CORRESPONDENCE.

[While THE OPHTHALMOSCOPE will at all times welcome correspondence from its readers, the Editor does not hold himself responsible for any views expressed in this column.]

NOTES FROM SOME CONTINENTAL EYE CLINIQUES.

Letter from Professor Fuchs referred to in the foot-note on page 433.

DEAR DR. THOMSON,

As regards the questions you enunciate in your letter, I beg to answer as follows :—

(1). I operate in cases of simple glaucoma only when there is distinct increase of tension.

(2). A preliminary injection of morphine and scopolamine is used only in exceptional cases, when an inflamed eye is likely to be very sensitive at the operation. Our patients keep, as a rule, pretty quiet, perhaps because the cocain is administered long and freely, so that even the iris becomes practically anæsthetised.

(3). We boil all our instruments. For this purpose a 1 per cent. solution of sodium carbonate is used, and the boiling is carried on for at least three minutes. It is certain that the edges of the knives are not benefited by the boiling. However, the blades behave very differently in this respect, probably according to the degree of hardening given to the steel. I have had cataract knives which, after having been boiled for forty operations, have been as good as at the beginning ; and on the other hand, sometimes a knife becomes blunt by a single boiling.

[In some following paragraphs the Professor explains that for several years he operated from behind the patient, but found that the surgeon is easily dazzled when he faces the window. The handlamp, he says, is only used in very dull weather. The forehead lamp is open to the objection that its reflex comes right in the middle of the cornea.]

No atropine is given before a cataract operation, nor instilled after it. The cortical fragments are removed only after the peripheral iridectomy, because they pass easily through the bottonhole coloboma, whereas, as long as the iris is intact, they are caught behind it.

The sticking plaster, used after cataract operations under the wire mask, is a band of linen having on its two ends some "emplastrum saponatum," which sticks only loosely, so that its removal does not hurt the patient, as is the case with leukoplast or other kinds of rubber plaster. This latter is used only for fixing Snellen's aluminium shield, and then only the upper extremities of the bands of plaster sticking on the forehead are detached when renewing the bandage. The lower extremities remain attached to the cheek, and, after renewal of the cotton pad, the shield with the old bands of plaster is re-adapted over the eye.

Very old patients, and those who have difficulty in breathing, urinating, etc., are not put to bed after the operation, but are immediately seated in the easy chair.

With kind regards,

Yours very sincerely,
E. FUCHS.

(In a second letter Professor Fuchs says, in reference to page 377, line 13, that the operator, not the assistant, completes the toilette of the eye.)

VOLUNTARY NYSTAGMUS.

To the Editor of THE OPHTHALMOSCOPE.

DEAR SIR,

I would like to add the following to the small number of cases of voluntary nystagmus detailed in the June number of THE OPHTHALMOSCOPE.

Young man, aged 22 years, student, is able to produce, by staring fixedly at some object, a horizontal voluntary nystagmus of about 1 mm. amplitude and of great rapidity. It was binocular. There was no muscular imbalance, and a slight amount of hyperopia and astigmatism.

Sincerely yours,
ST. JULIEN R. DE CARADENC.

20, HARRIS STREET WEST,
SAVANNAH, GEORGIA, U.S.A.
July 13th, 1912.

THE

OPHTHALMOSCOPE.

A MONTHLY REVIEW OF CURRENT OPHTHALMOLOGY.

VOL. X.—No. 9.] *SEPTEMBER 1, 1912.* [TWO SHILLINGS.

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ORIGINAL COMMUNICATIONS.

STUDIES OF THE ACCOMMODATION.

BY
ALEXANDER DUANE, M.D.
NEW YORK.

Scope and Purpose of the Investigation.—Results attained.

FIVE years ago while investigating the subject of artificial cycloplegia, I had occasion to measure the accommodation carefully in a number of subjects. I soon became convinced that the mean values which Donders assigned to the accommodation fifty years ago, and which have been adopted in text-books ever since, were in some respects erroneous. This conviction led to a re-examination of the whole subject. The study thus inaugurated has been kept up continuously since then.

Apart from a brief preliminary notice in a paper* read before the New York Academy of Medicine, February 17th, 1908, the first communication was made to the American Ophthalmological Society† in the summer of 1908. This was based on quite a large number of cases, which by the time the paper was printed, had increased to 400.‡ A second, much more complete, presentation, based on some 600 cases, was made to the American Medical Association in June, 1909.§ The results then given were, with some slight necessary modifications, adopted by various authorities** as a substitute for those of Donders.

While pursuing this investigation I have received much valuable assistance from those who have now been associated with me from time to time in my office. Among those who have rendered most important aid are Drs. J. B. Thomas, H. Stiles, and J. Birckhead.

In the progress of an investigation like this, if properly conducted, each successive step should represent a close approximation to the truth. The earlier findings, based on insufficient data, vary somewhat widely, and, in particular, somewhat irregularly from those finally accepted. Then, as observations multiply, the findings become more and more abundant, and our confidence in them correspondingly increases. Ultimately, when the addition of each successive hundred cases but serves to confirm the results already obtained, we may be warranted in believing that these results are as nearly accurate as can be had by the method of observation employed.

This seems now to be the case with the subject in hand. As the following comparison shows, three years' further observation†† has made but slight alteration in the values found in 1909; and even the values found in 1908, although based on an examination confessedly incomplete, do not at any point differ by as much as a dioptry from the values now adopted.

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* "When and why shall we use cyclopegics in refractive work?"—*New York State Medical Journal*, June, 1908.

† *Transactions Am. Ophth. Soc.*, 1908, p. 634 (reviewed in THE OPHTHALMOSCOPE, 1909, p. 626).

‡ In this paper the moderate discrepancy between the chart, which shows the results graphically, and the table, which shows the results in figures, is due to the fact that the table, which was revised in the proof, is based on a greater number of cases than the chart.

§ *Journ. Am. Med. Ass.*, June 19, 1909.

** Füchs, "*Lehrb. d. Augenheilk.*," 12te Aufl.; Weeks, "*Diseases of the Eye*"; Percival, "*The Prescribing of Spectacles.*"

†† Made the subject of a second communication to the American Medical Association (presented in June, 1912).

TABLE I.

Comparisons of Results obtained in successive observations.

The mean value of the accommodation for each age is given in D., the near point being measured from the anterior focus of the eye (13mm. in front of the cornea).

Age.	1st series (1908) 400 cases.	2nd series (1909) 600 cases.	3rd series (1912) 1,050 cases.
10	14·0	14·2	13·4
15	13·0	13·2	12·6
20	10·7	11·5	11·5
25	9·6	10·3	10·2
30	8·8	8·5	8·9
35	7·0	7·0	7·3
40	5·9	6·0	5·9
45	3·8	3·8	3·7
50	1·8	1·8	2·0
55	1·3	1·3	1·3
60	1·2	1·2	1·1

The differences between the last two sets of observations are shown graphically in Fig. 3, in which are given the maximum and minimum as well as the mean values for each age.

As will be seen, the main changes are as follows:—

1. The sinuosities and irregularities of the original curves have been eliminated. This is the usual result of multiplying observations in an investigation of this sort.
2. Up to 28 both mean and maximum values are somewhat less, and from 28 to 40 are somewhat greater than formerly found.
3. Up to 35 the minimum values are slightly higher.
4. Beyond 36 the minimum values are lower and beyond 40 the maximum values higher, so that the normal limits are wider apart than had formerly been supposed.

The last-named difference is the only one of real importance, and here the validity of the final results seems particularly well attested.* In any event, the differences are not great, and are such as one would naturally encounter in a cumulative series of investigations.

Furthermore, we now seem to have reached the point where the addition of one hundred or of two hundred more cases does not appreciably affect the results. This is particularly the case for those ages (between 40 and 60) where the most important differences between the former and the final results obtain.

---

*Compare Figs. 1 and 2 for the later ages, and note the large number of cases observed.

It seems, therefore, that the findings here presented can be accepted as representing a close approximation to the true values.

Plan of the Investigation.

The plan pursued in the investigation was as follows :—

In each subject tested the refraction was first carefully determined, homatropine being used in the case of almost every patient under 48 years.

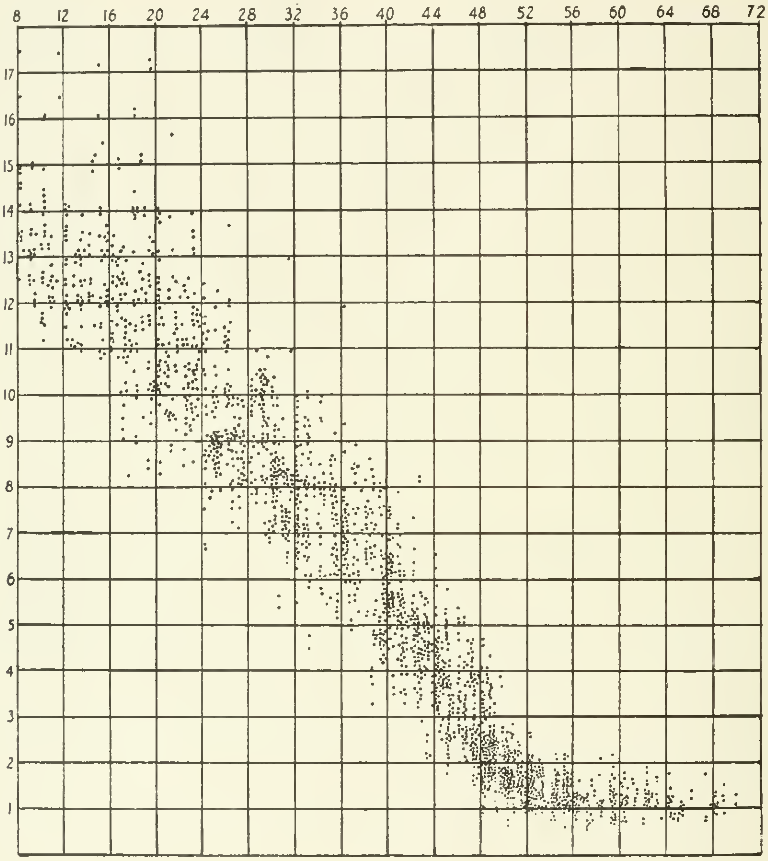

FIG. 1.

The Accommodation at Different Ages.

Each dot represents the maximum accommodative power of an individual eye at a given age, the figures on the side of the chart denoting the accommodation in D., the figures at the top denoting the age. The accommodation was determined by rendering the patient emmetropic and measuring the distance of his near point from the anterior focus of the eye, *i.e.*, from a point 13 mm. in front of the cornea. This, of course, gives higher values for the accommodation than if the measurement is made, as is generally done, from the cornea itself. (Cut and description from paper by the author, presented to the American Medical Association, June, 1912.)

The full refractive correction being applied and the subject being thus rendered emmetropic, the distance of his near point from the anterior focus of the eye was carefully measured with a Prince's rule* that gives the accommodation in dioptries. As the subject's far point had been placed at infinity by his glass, the result evidently represented his total range of accommodation.

---

*For the Prince's rule may be substituted any similar home-made apparatus. Indeed, better than the rule with its polished surface, is a plain stick, 50 cm. long, of dull-tinted wood with unvarnished surface, marked off in centimetres on one side and in dioptries and fractions on the other.

This value of the accommodation in each case was set down on a chart (see Fig. 1), and from the total mass of observations were deduced (*a*) the mean values of the accommodation at each age, and (*b*) the limits within which this accommodation may vary in subjects that can properly be regarded as normal. The values for the mean range being connected give the mean accommodation curve.

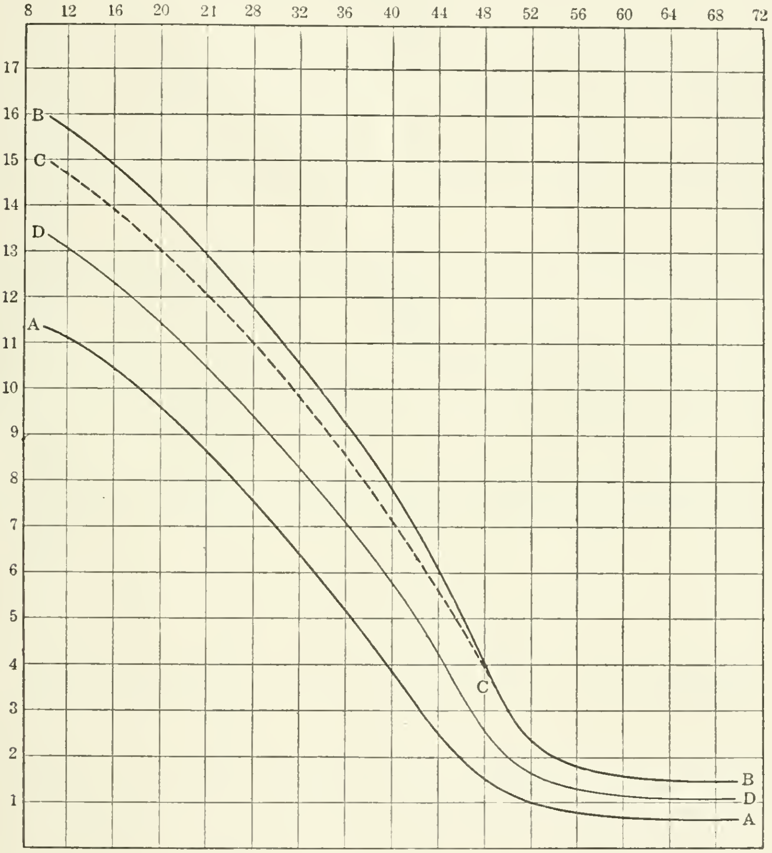

FIG. 2.

Limits of the Accommodation in Normal Cases.

The vast majority of the dots represented in Fig. 1 are included between the curves AA and BB, and for the most part between AA and CC. These, therefore, represent the lower and upper limits of normal cases. Cases lying below AA are subnormal, and above BB, supernormal. The rate of of descent of the accommodation in persons with high accommodative power is shown in BB, and the less rapid descent in those of low accommodative power is shown in AA. DD is the "mean curve" representing the rate of descent of what may be called an average case. (Cut and description from paper by the author, presented to the American Medical Association, June, 1912.)

I may say that the expression "mean curve" seems to me to have very little significance. From a mass of observations such as these, several mean curves might be constructed, some running a little higher, others a little lower than that here adopted. Far more significant and convincing as indicating the curve pursued by the declining accommodation is the downward sweep of the whole mass of dots shown in Figure 1, stretching in a sort of galaxy from top to bottom of the chart, or the trend of the maximum and minimum lines (AA and BB, Fig. 2) which define the upper and lower limits of the mass. And what is true physiologically is also true clinically. When investigating the accommodative power of a given patient, we do not so much care to know whether it is close to the value assumed as the average for his age, but whether it lies well within the normal limits. Thus, in a person of twenty-five we are not so much concerned to know whether the mean accommodation is 10, 10.5, or 11 D., as to know that his accommodation should not be below 8·5 D. nor much above 12 D.

Indeed, the main significance that attaches to the mean curve DD is that it shows about how fast the accommodation declines in what may be called the average case. As Fig. 2 shows, in a person with high accommodative power (*i.e.*, one whose accommodation lies above DD), the decline would be more rapid, and in a person with low accommodation prove less rapid than in the average case.

It might be thought that in a series of observations covering four or five years, one could tell the normal course of the accommodation by determining its course during this time in a number of individual cases. The course in any single case, however, varies so greatly and is so affected by accidental circumstances that such a method would be misleading. This is well shown in Fig. 4, in which the mean curve as deduced by the method adopted is compared with a number of partial curves deduced from individual cases.

In all, 1,500 cases were examined. For reasons to be detailed later, the results in some 450 cases were rejected. The remaining 1,050 were utilized. The results are given numerically in Tables 2 and 3.

TABLE 2.

Normal Values of the Accommodative Power at all ages from 8 to 68.

Accommodation is given in dioptries and tenths, near point being measured from the anterior focus of the eye, *i.e.*, from a point 13 mm. in front of the cornea.

Age.	Lower Limit in normal cases.	Mean Value.	Usual Upper Limit.	Extreme Upper Limit.
8	11·7	13·8	15·4	16·4
9	11·6	13·6	15·2	16·2
10	11·4	13·4	15·0	16·0
11	11·2	13·3	14·9	15·8
12	11·1	13·1	14·7	15·6
13	10·9	12·9	14·5	15·4
14	10·8	12·7	14·3	15·3
15	10·7	12·6	14·1	15·2
16	10·5	12·4	13·9	14·9
17	10·3	12·2	13·7	14·6
18	10·1	11·9	13·5	14·4
19	9·9	11·7	13·2	14·2

Age.	Lower Limit in normal cases.	Mean Value.	Usual Upper Limit.	Extreme Upper Limit.
20	9·7	11·5	13·0	14.0
21	9·4	11·2	12·8	13.7
22	9·2	10·9	12·6	13.5
23	8·9	10·6	12·3	13.2
24	8·7	10·4	12·1	13·0
25	8·4	10·2	11·8	12·7
26	8·2	9·9	11·6	12·4
27	7·9	9·6	11·3	12·1
28	7·6	9·4	11·1	11·8
29	7·3	9·2	10·7	11·5
30	7·1	8·9	10·4	11·2
31	6·7	8·6	10·2	10·8
32	6·4	8·3	9·9	10·5
33	6·1	8·0	9·6	10·2
34	5·9	7·7	9·2	9·9
35	5·6	7·3	8·9	9·6
36	5·3	7·1	8·6	9·4
37	4·9	6·8	8·2	8·9
38	4·6	6·5	7·9	8·6
39	4·3	6·2	7·6	8·2
40	4·0	5·9	7·2	7·8
41	3·6	5·4	6·8	7·5
42	3·2	5·0	6·4	7·0
43	2·8	4·6	5·9	6·5
44	2·5	4·2	5·5	6·1
45	2·2	3·7	5·2	5·6
46	1·9	3·3	4·8	5·1
47	1·7	2·8	4·3	4·5
48	1·5	2·5	3·9	4·0
49	1·3	2·2	3·4	3·4
50	1·2	2·0	3·0	3·0
51	1·1	1·8	2·6	2·6
52	1·0	1·6	2·3	2·3
53	0·9	1·5	2·1	2·1
54	0·9	1·4	2·0	2·0
55	0·8	1·3	1·9	1·9
56	0·8	1·2	1·8	1·8
57	0·8	1·2	1·7	1·7
58	0·7	1·1	1·7	1·7
59	0·7	1·1	1·6	1·6
60 to 68	0·7	1·1	1·5	1·5

TABLE 3.

Approximate Values of Accommodation for each Four-Year Period.

Accommodation is given in dioptries and fourths, near point being measured from the anterior focus of the eye, *i.e.*, a point 13 mm. in front of the cornea.

Age.	Lower limit in normal cases.	Usual Upper Limit.	Age.	Lower limit in normal cases.	Usual Upper Limit.
8	11.50	15.50	**36**	5.25	8.50
12	11.	15.	**40**	4.	7.
16	10.50	14.	**44**	2.50	5.50
20	9.50	13.	**48**	1.50	4.
24	8.50	12.	**52**	1.	2.25
28	7.50	11.	**56**	0.75	1.75
32	6.50	10.	**60**	0.75	1.50

Precautions observed.

If the tests are to have any value, the following precautions must be observed* :

1. The subject's vision must be such that he can make the fine distinctions required. We were, therefore, obliged to reject cases of irregular astigmatism, most cases of high myopia and of high astigmatism, even when corrected, of amblyopia from any cause, but especially amblyopia associated with any defect of central vision, of poor sight from corneal or lenticular opacities, etc. Persons thus affected cannot discriminate between the blurring due to accommodative failure and the blurring due to their naturally defective vision. In general, no subject was utilized whose vision was less than $\frac{20}{20}$.

2. The full correction being applied, and the eye not under examination being screened, the test object is brought up until it blurs, then withdrawn until it clears, and then carried back and forth several times until we can be sure of the very nearest point where it begins to blur. This will be the near point, and the corresponding amount of accommodation in D., read off from the scale, will give the patient's range.

3. If the near point is closer than 10 cm. a slight error in determining its position will involve an error of one or more D. in the value found for the range of accommodation. In such cases, after making the test with the full correction alone, it is well also to make it with this correction combined with a —3.00 D. or —4.00 D. sphere, so as to carry the near point out beyond 10 cm. The value then found for the range must be increased by the amount of this added lens.

4. If the near point is beyond 40 cm. it must be brought within measurable distance by the addition of a convex glass to the patient's full correction. From the value of the range thus found the strength of this convex addition must, of course, be subtracted.

5. It is necessary to make repeated tests if we wish to discover the subject's real accommodative power. This is especially true of young subjects in

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* Much of what follows regarding these precautions is quoted verbatim from the author's paper read before the American Medical Association, June, 1909.

whom the first test rarely reveals the true range. Because of this fact I have been obliged to exclude a number of observations in which I was able to make the test but once under proper conditions; also cases in which the subject later exhibited a greater accommodation or in which the variations were so extreme as to prevent any trustworthy deduction being made from them. Small variations, however, we must expect to meet with, since every now and then almost any subject will fail to exert his accommodation to the utmost, no matter how we urge him. Since what we wish to determine is a person's maximum accommodative power, we take in such a case of moderate variation the highest value found, unless there is some reason to regard it as erroneous. The variations in an average case are exhibited in the accompanying excerpt from the records, which incidentally shows the form used in tabulating the observations:

J. Walter E———, aged 9½. Refr. R. and L. +0.50 +0.50 cyl. 180° (atropine). $V.=\frac{15}{10}$.

DATE.	GLASS USED.	ACCOMMODATION.			
		With glass.		Net.	
		R.	L.	R.	L.
Nov 1, 1909	+ 0.50 cyl. 180°	12	10 11.5	12 +	10.5 12
	,, with —4.00 added	6.5	6.25	11	10.7
Dec. 4, 1909	+ 0.50 cyl. 180°		12		12.5
	,, with —4.00 added		6.7 7.6		11.2 12.1
Mar. 12, 1910	+ 0.50 cyl. 180°	12	12	12.5	11.5
	,, with —3.50 added		8.5		12.5

In this case the value 12.5 was selected for plotting on the chart, as representing most nearly the subject's apparent maximum accommodation at the time.

6. We must make sure that the patient tested understands just what is required of him. In particular, we must tell him (a) to put forth all his efforts and strain as hard as he can, so as to focus down on the test object at the closest possible point; (b) to be careful to indicate the precise point where the test object begins to blur—not the point where it becomes entirely confused.

7. We must be sure that the patient is physically fit for the test. He must not be incapacitated from exerting his full accommodative power by muscular exhaustion, neurasthenia, or similar causes. In the present series of cases I had to reject a number of observations in which the patient exhibited a temporary incapacity thus occasioned.

8. The test object must be satisfactory. Donders used a wire optometer and fine print. For most people, however, these two tests, and especially the latter, make the near point appear too close—giving thus an over-estimate of the range. This is particularly the case when the accommodation is high. The near point is then close to the eye, and fine print can be brought up until it subtends a large visual angle. Under these conditions the print appears so large as to be readily legible even when somewhat blurred. Moreover, as we are accustomed to reading print that is not perfectly sharp

and as we often distinguish letters more by a guess at their general outline than by a clear perception of their component parts, a person is apt to call fine print distinct when it is not really so. We need, in fact, as a test some simple sharply-defined object, any blurring of which will be instantly detected. After trying various objects—dots in pairs and groups, parallel lines, simple geometric figures, etc.—I have found the best test object* to be a single engraved black line, 0·25 mm. thick and 3 mm. long, bisecting a white, oblong card which is 3 mm. long and 1.25 mm. wide and is mounted on a disc of black velvet (see Fig. 5). The moment the line is brought within the near point it blurs (broadens) and then doubles. The line should be so held as to be most clearly seen. Most people see it best when held vertical.

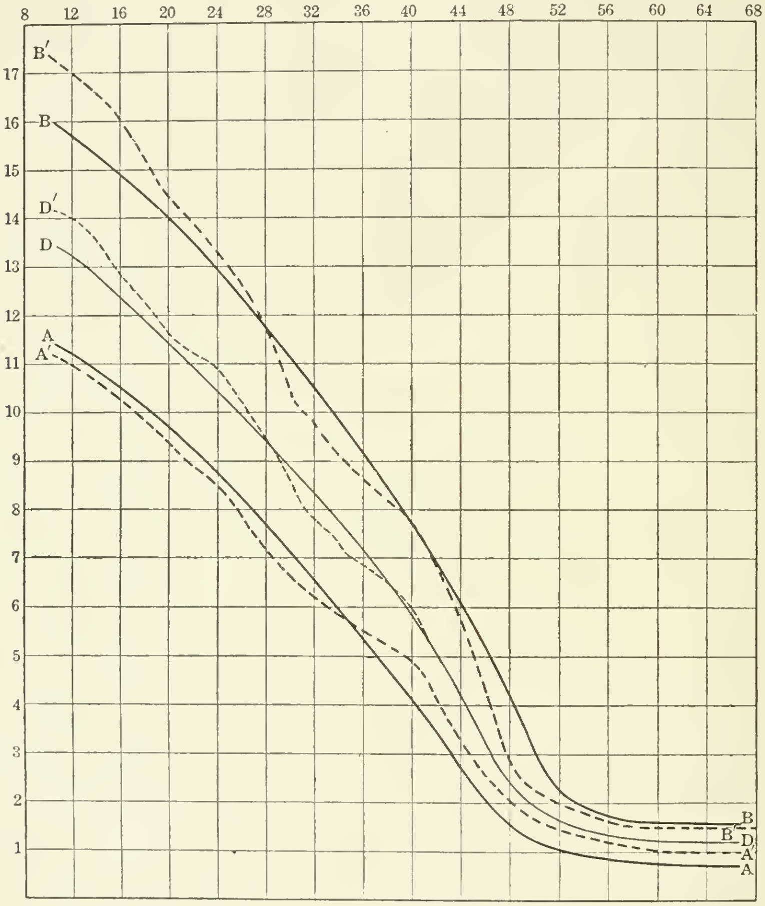

Fig. 3.

Comparison of Early and Final Results.

AA, BB and DD, as in Fig. 2. A'A', B'B', and D'D', corresponding curves found three years ago. Note the more regular course of AA, BB and DD, and the fact that in them the upper limit is lower before the age of 25, while after the age of 40 the upper limit is higher and the lower limit lower than previously found. (Description and cut from paper presented by the author to the American Medical Association, June, 1912.)

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* Described in THE OPHTHALMIC RECORD, August, 1909.

9. The illumination should be suitable. This is a matter of great importance, and lack of attention to it may cause an underestimate of one or more D. The light must be good but not dazzling (diffused daylight is the best), and must come almost straight from behind—over the right shoulder when the right eye is tested and over the left shoulder when the left eye is tested. There must be no shadow on the card which bears the line and no dazzling reflections nor confusing lights beyond it or alongside.

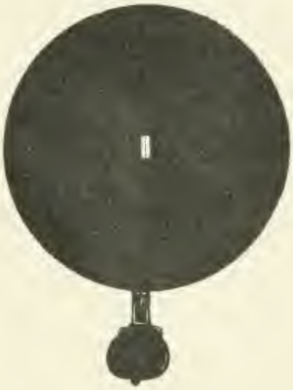

FIG. 5.

Accommodation Disc for Determining Near Point *

10. We must be careful to define the point from which we make our measurement, and take care that we do actually measure from this point each time. Donders measured from the nodal point of the eye, while the tables usually given presuppose a measurement made from the anterior principal point of the eye, *i.e.*, practically from the anterior surface of the cornea. I prefer to measure from the anterior focus of the eye, *i.e.*, from a point 13 mm. in front of the cornea, because this is the point at which we place the convex glass that we use to measure the accommodative power with and to replace the latter when absent. Thus, when we speak of a deficiency of accommodation of 6D. we mean one that will be compensated for by a lens of that strength placed at the anterior focus—not at the anterior principal point—of the eye. So, too, when we speak of a hyperopia of 6D. we mean one which is corrected by a convex glass of that strength placed at the anterior focus of the eye. If we shifted the compensating glass to the anterior principal point of the eye we should need one of 6.5D. to accomplish the desired result.

In spite of all our precautions we are often uncertain as to the findings. Sometimes from their very character they are obviously open to suspicion. Again, in the same subject they often vary widely on different days or even on the same day, so that we know not which reading to trust. For this there are many reasons.—The patient may be inattentive, or fail to understand that he is to observe, and so give false information ; or, more often, he is lazy and unwilling to make the effort necessary to bring all his accommodation into play ; or his judgment and his interpretation of what he sees vary from one time to another. We can often discount these sources of error, and by a little adroitness or by cumulative tests, get a comparatively stable finding. In other cases, however, we are obliged to reject the finding altogether on account of the inexplicable discrepancies. This is especially the case when the accommodation is high, since then small variation in the measurements will make large differences in the results.* Thus, if the accommodation is 16 D., a variation of 4mm. made in measuring the distance of the test line from the eye will make a difference of one dioptry in the estimate ; while if the accommodation is 8 D. it would take a variation of 18 mm. to make the same difference. As the accommodation is high in children, and as in them, too, the observations are very often vitiated by the effects of imagination, exaggeration, or inattention, the results obtained in those below the age of 15 are presented with a certain reserve and as subject to correction later.†

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* From Fuchs' "*Text-book of Ophthalmology.*"

There is another reason for these variations being highest in the very young. When we measure the accommodation by any method, we do not measure the total power of the ciliary muscle, but only that portion of it which is of avail to change the shape of the lens (manifest accommodation). The remaining portion (the latent accommodation) escapes our observation altogether. In the young, nearly all the power is manifest, or measurable, while in older persons a considerable portion is probably latent. Hence, in the very young almost any variation in the amount of exertion put forth by the ciliary muscles will be apparent at once, while in an older person an even greater variation may escape detection because affecting only the latent portion of the range.‡ Hence, in the very young, the accommodation may seem to be very variable, when really it is not more so than that of the man of thirty or forty.

Comparison with the Results of Others.§

My results, as given in Figures 1 and 2 and in Tables 2 and 3, are to be compared with those determined by Donders and some others. The comparison with Donders' results is shown in Figure 6.

From this it will be observed BB differs from Donders' curve, as ordinarily depicted in the text-books, in two particulars.—In the first place, it rises higher at the start, reaching 18 instead of 14 D. In the second place, it does not touch the base line or O even at the age of 68. The reason for the first difference is that Donders' curve, as ordinarily drawn, represents the near point when measured from the anterior principal point of the eye, while, in order to make it comparable with our curve, I had to draw it as if measurement had been made from the same point as for the latter. *i.e.*, the anterior focus of the eye. The second point of difference arises from the fact that Donders' curve, as usually drawn, shows the absolute position of the near point in his patients, whether they were emmetropic or hyperopic, while, to make it comparable with the new curve, and to show the actual range of accommodation as he found it, I had to change his curve to what it would be if his elderly hyperopic patients were rendered emmetropic by glasses. To do this, I had to shift the far point in all his hyperopic cases up to the base line and shift the near point correspondingly upward.

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*As above stated, this cause of error may be practically obviated by adding a concave glass to the refractive correction, and making a corresponding addition to the finding obtained.

† It is unlikely, however, that such correction will exceed one D. at most.

‡ This is Hess's contention, but there are weighty reasons for believing that it has not the force that he would ascribe to it.

§ Quoted in part from my paper of 1909 with the proper modifications deduced from the latest observations, It will be noted that the new curve (AA) differs from that of Donders' (BB) in three important particulars :—

1. Before the age of 20 the new curve falls below his. Here, owing to the comparatively small number of cases and to the difficulty of getting accurate results when the accommodation is high and the patient is young, the results must be regarded as in a measure uncertain. Yet I think that the probable error in our findings is not over one D., and that in any case Donders' results for the early ages (10 to 15) are distinctly too high.

2. From 20 to 46 the new curve rises above his.

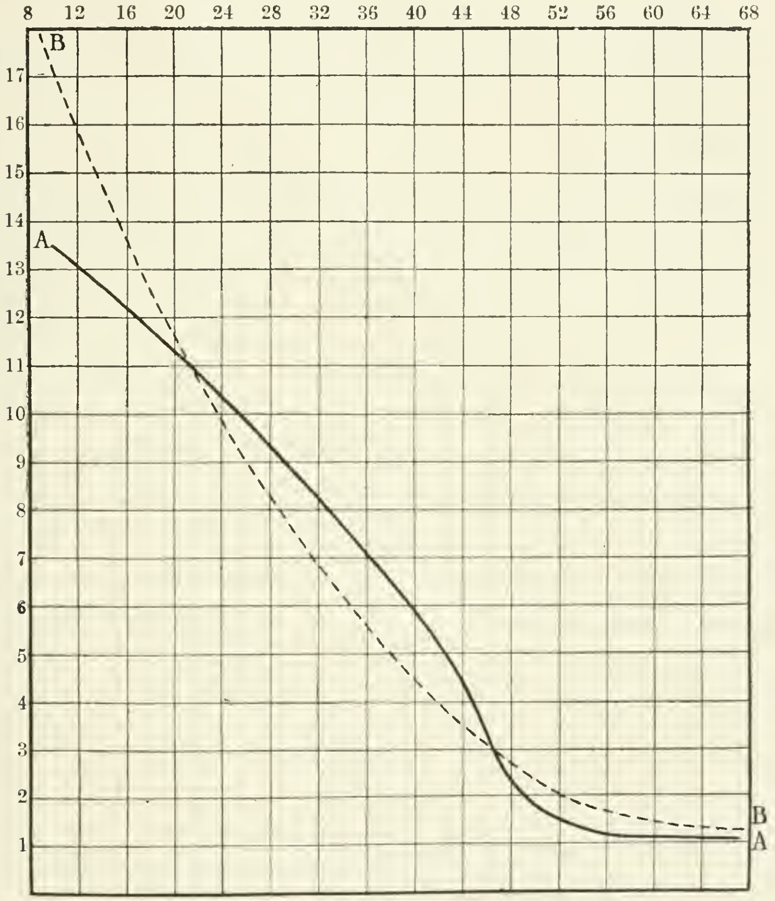

FIG. 6.

Comparison of Results with those of Donders.

The unbroken line, AA, shows the "mean curve" (indicating the fall of the accommodation year by year in the average case) ; the dotted line, BB, similar curve as deduced by Donders.

3. From 46 on it falls below his. The difference here is due to the sharp plunge that takes place between 37 and 47.

Both according to our observations and those of Donders, the accommodation remains nearly constant after the age of 53, diminishing not more than 0.50 D in fifteen years. We find a somewhat lower range than Donders did for this time of life.

Hess believes that the accommodation shown in advanced life is in part spurious, the patient being able to see distinctly within his true near point, because his pupil is very narrow and hence has the sharp defining power of a stop or stenopæic aperture. But in a number of patients that we examined between the ages of 50 and 60 the pupil was fully 3 mm. in diameter, so that Hess' explanation would not account for the range of one D. or more that these patients showed.

The numerical differences between Donders' observations and ours is shown in Table 4.

Table 4.

Numerical difference between Donders' observations and Author's observations.

Range in D. near point being measured from anterior focus of eye = 13 mm. in front of the cornea.

Age.	Author's Observations.		Donders' Observations.	
	No. of Cases.	Mean.	Mean.	Cases.
10	11	13·4	18·0	5
15	13	12·6	15·0	8
20	16	11·5	11·8	7
25	24	10·2	9·7	4
30	29	8·9	7·8	5
35	21	7·3	6·0	2
40	27	5·9	4·8	5
45	26	3·7	3·7	...
50	40	2·6	2·6	...
55	19	1·3	2·0	...
60	11	1·1	1·5	...

We believe that the present results are more trustworthy than those of Donders because of the following facts :—

A. They were obtained from over eight times as many subjects, more than 1000 in all.

B. The patients were rendered absolutely emmetropic by glasses, and no subject was utilized in whom the total refraction had not been carefully determined ; while it is probable that many of Donder's cases, especially between the ages of 20 and 45, had an uncorrected latent hyperopia, which would make his estimate of the accommodation too low by 1 or 2 D. Hence the fact that our curve rises higher than his during this period.

Recently Giordano* has examined the accommodation of a number of

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*"*Influenza dell' erà sul potere di accommodazione*," on p. 303 of *Proceedings*, Eleventh International Congress of Ophthalmology, held at Naples, 1909.

subjects and has given a diagram of his results. If, as is usually done, the near point was measured from the anterior surface of the cornea, his results would be equivalent to the following, in which the near point is measured from the anterior focus of the eye.

Age.	Accommodation in D., near point being measured from anterior focus of eye.
10	13·1
15	14.2
20	15·5
25	12.2
30	10.8
35	8.3
40	5·9
45	4·5
50	3·4
55	2.8

The mean value assigned for the age of 20 I regard as excessively high, since it rises above even the maximum value that I have found for that age. So, too, the value for the age of 25 seems to be excessive. Nor can I agree with Giordano that the accommodative power increases rapidly between the ages of 10 and 20[*], and drops sharply thereafter. Rather, as Figure 1 shows, the accommodation descends by a gradual steady sweep from the age of 10 to 37; then falls away more abruptly during the next ten years; and then decreases more and more slowly until, after 53, it drops hardly at all.

Clinical Aspects of these Studies.

The important feature of these studies is their clinical bearing. This can be only touched upon here, although I hope to present a full discussion of it later.

One fact has been strongly impressed upon me as these studies have progressed, and that is the great importance of measuring the accommodation in doing routine refraction work. Indeed, such a measurement should be made whenever a patient is tested for glasses. We have all been accustomed to do this after a fashion, in our presbyopic patients at least, by ascertaining the distance at which Jaeger No. 1 can be read. But this is a comparatively rough test, and much more satisfactory results can be secured if the examination is made with the precautions here detailed and with the apparatus described, which gives a convenient and accurate means of determining the accommodation for clinical purposes.

In determining the refraction with homatropine, I find it very helpful to measure the accommodation carefully as the near point recedes under the cycloplegic, adding, of course, a convex glass as the relaxation gets more and more complete. To get a satisfactory result with homatropine, the cycloplegia should be so complete that the range of accommodation is certainly less than 1 D. Whether this point has been reached or not, can be ascertained by the tests here used. A +3.00 D. or a higher glass, according to circumstances, is added to the manifest distance correction, and the patient's relative far and near points are then determined with this addition by sweeping the accommodation disc along the rule and finding how close it can be brought and how far off it can be carried without blurring. If the difference between the two points exceeds 1 D., we infer that the relaxation is not yet complete and hence instil more homatropine and defer the examination for another half hour or so, when a renewed examination may perhaps show a smaller range; *i.e.*, a more complete cycloplegia. Tests made in this way give a surer result than if the examination for glasses is made at some arbitrary time after the instillation of the homatropine without regard to whether the accommodation has relaxed completely or not.

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[*] I may say that some of my own earlier observations inclined me to a similar view, which, however, was quite negatived by my subsequent findings.

Furthermore, if the patient's observations are accurate, the determination of his far point with the line and rule when he is under a cycloplegic may settle some nice question as to the precise refraction. Thus, a patient may show in both eyes 1.75 D. of hyperopia, and yet we may be a little uncertain from his answers whether 1.75 or 1.50 is the proper finding. We put on a + 5.00 D. and determine the far point. If in the right eye this is found to be 3.25 D. and in the left 3.50, then presumably the right eye is hyperopic 1.75 D. and the left eye 1.50 D., and we shall have to make a difference of 0.25 D. between the glasses prescribed for the two eyes.

Again in post-cycloplegic tests the determination of the near point shows us whether there is or is not some lingering remnant of cycloplegic effect, failure to detect which might lead us to prescribe too strong a glass. If, for example, tests made at the time the cycloplegic was instilled showed a net accommodation 7 D. and the post-cycloplegic test showed an accommodation of only 4.5 D, we should infer that the ciliary muscle was still acting imperfectly and that it would be better, particularly if it were a question of prescribing a reading glass, to wait for a day or too until the accommodative power had been more completely restored.

When examining presbyopic patients, it is very important to determine the accommodation carefully. In prescribing glasses for presbyopia we have to consider many factors, such as the sharpness of sight, the character of the work, the distance at which it has to be put, the age of the patient, etc. Yet, as a rule, in patients over 48 a glass to be comfortable should not bring the near point closer than 25 cm. (4 D.) and most persons find it better to have the near point at 29 cm. (3.4 D.). This refers, of course, to the near point as determined with the hair line according to the plan here advocated. If the test were made with fine print, a different estimate would be had, because with most persons fine print can be read some little distance within the near point, and is even said to be quite clear, since with this sort of test-object a slight blurring escapes notice. Measurements with the accommodation disc will show with what glass the near point is brought to the proper distance, and will often indicate better than anything else the proper prescription to be given.

Now and then, especially in the case of presbyopes, we find an unequal accommodation, which has to be reckoned with in prescribing glasses. Such unequal accommodation does not necessarily imply that the total accommodative effort is different in the two eyes or that the ciliary muscles in the two fail to contract alike. It may mean that the rigidity of the lens is not the same in one eye as in the other. At any rate, we do find cases in which the manifest accommodation differs by from O. 5 to I.O.D. in the two eyes. In these cases it is often, but not always, necessary to give the eye with the weaker accommodation a relatively stronger addition for reading.

Cases of subnormal accommodation are not infrequent. Such subnormal accommodation is often transient, but may be lasting, and in either case often gives rise to asthenopia or other symptoms. It is in many cases amenable to treatment, particularly when, as frequently happens, it is associated with an insufficiency of convergence. In some cases, however, the accommodation remains permanently low and is unaffected by treatment (premature presbyopia). Such cases have to be treated as if they were veritably presbyopic.

Excessive accommodation is occasionally met with, but I am not sure whether in itself it ever produces symptoms of moment.

Conclusions.

1. From repeated careful examinations conducted for five years, in 1,500 subjects, of which 1,050 were available for tabulation, it has been possible to determine, with apparently sufficient accuracy, the mean, minimum, and maximum values of the accommodation at all ages from 8 to 68. These values are shown numerically in Tables 2 and 3 and graphically in Fig. 2.

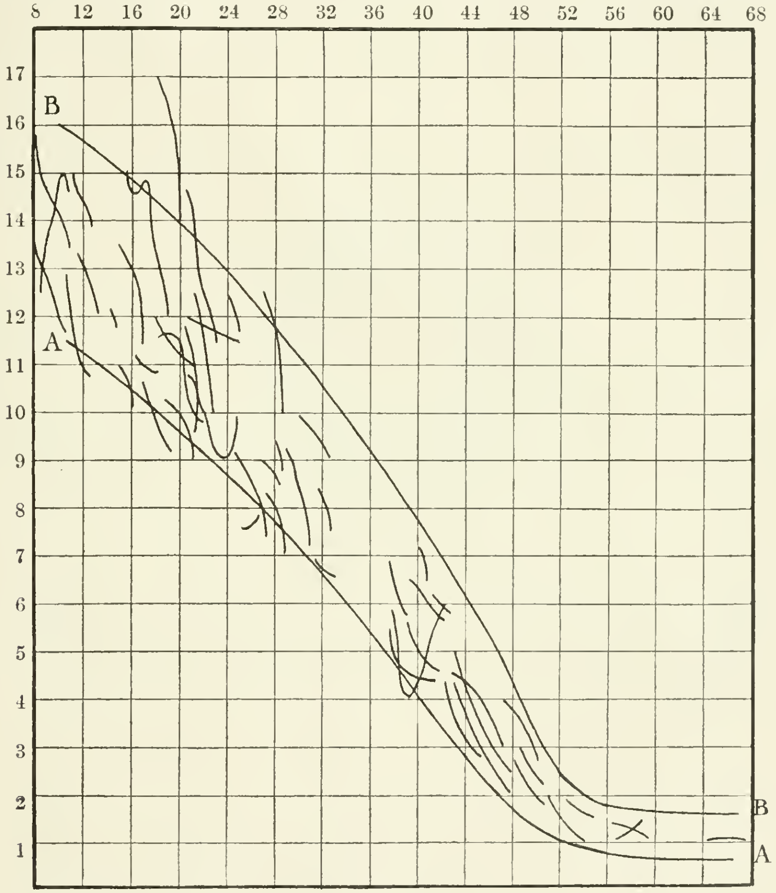

Fig. 4.

Decline of the Accommodation in Individual Cases.

The short irregular lines show the change in the range of accommodation during two or more years in persons of various ages. AA, BB, normal upper and lower limits of range as deduced from the whole mass of observations.

2. The mean values differ somewhat from those of Donders, the main differences being shown in Fig. 6 and in Table 4.

3. It is believed that the new values are more accurate than those of Donders, because made on over eight times as many subjects and because in the present series of cases all ametropia was carefully neutralized by glasses in every instance, while in many of Donders' cases it is probable that the presence of an uncorrected latent hyperopia vitiated the results to the extent of a dioptry or more.

4. The methods used furnish a convenient and accurate means of determining the accommodation for clinical purposes. Such a determination should be made in every person who is being examined for glasses. The results of this determination afford clinical *data* of considerable importance, which may often cause us to modify our prescription for glasses or to institute treatment for subnormal accommodation.

THE MECHANISM OF ACCOMMODATION AND THE COMPARATIVE ANATOMY OF THE CILIARY REGION.

BY

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NOTWITHSTANDING all the efforts made to establish the mechanism of accommodation on a satisfactory basis, it cannot with truth be said that any theory yet brought forward has been fully proved.

It is true that Helmholtz's theory has received the widest acceptance, but, as I propose to demonstrate in the present paper, it fails to comply with certain essentially vital principles—physiological as well as mechanical—which must prove fatal to it; while with regard to Tscherning's views, they have been so ably refuted by Grossman* that I do not propose to discuss them further.

Much of the favour with which Helmholtz's views have been received is due to the fact that the *data* furnished by comparative anatomy are apparently in complete accord with them. There are, however, certain very tangible facts in connection with the disposition of the comparative anatomy of the ciliary region which have been overlooked, and which, even if considered alone, are sufficient to raise grave doubts as to the accuracy of accepted views.

Comparative Anatomy of the Ciliary Region.

In man the ciliary region extends from the *ora serrata* to the iris root as a zone of uniform breadth of from six to seven millimeters.

This region is sub-divided into a posterior and comparatively smooth area—the *orbiculus ciliaris*, and an anterior plicated portion—the *corona radiata*, created by the ciliary processes which are evenly and symmetrically distributed throughout the ciliary circumference.

In the animals which I have studied: horse, cow, sheep, pig, dog and cat, this same regularity does not, however, obtain, for in them the ciliary processes are neither evenly distributed nor are they all of an equal size, while the region of the orbiculus ciliaris always presents marked and characteristic variations in breadth.†

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* *Ophthalmic Review*, 1904.

† As for the present purpose only the general principles of the comparative anatomy of the ciliary region are essential, I have relegated details to an appendix at the end of this communication.

On the nasal side the ciliary processes are invariably more numerous, although distinctly smaller, than elsewhere in the ciliary circumference, while at the same time the orbiculus ciliaris is conspicuous by its absence.

In the superior quadrant, on the contrary, are to be found the largest ciliary processes, and the greatest extent of the orbiculus ciliaris.

In the temporal quadrant, both the size of the processes and the region of the orbiculus ciliaris tend to be smaller than above, while in the inferior quadrant there is a still further tendency to diminution in the size of both (Figs. 1, 2, and 3). This disposition of the ciliary region has certainly no relationship whatever to the shape of the pupil, as it is equally well marked in animals with horizontal pupils (horse, cow, sheep, and pig), as in the cat, which possesses a vertical pupil, or the dog with a circular one.

Figures 1, 2, and 3, illustrate these characteristic points in the case of the right eye of the horse which can be taken as typical of the named group of animals.

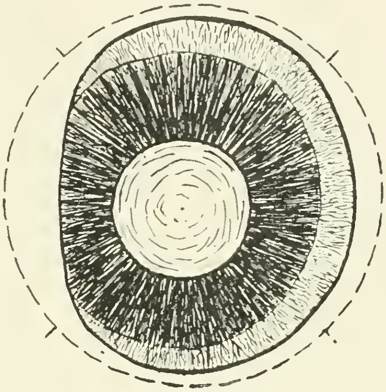

Fig 1. Posterior aspect of right eye of horse.

Natural size. Lens *in situ*. The globe is shown in broken outline. The boundary between the ciliary region and the retina instead of forming a circle with a serrated edge, as in the human eye, presents a clear-cut margin, with a more or less oval outline, and marked flattening on the nasal side produced by the absence of the region of the orbiculus. The apices of the ciliary processes lie in front of and covered by the equator of lens. Diameter of lens, 19 mm. Diameter of the ring formed by the apices of the ciliary processes, 18·5 mm. Total number of ciliary processes, 109.

Figure 1 shows the disposition of the ciliary region of the right eye as seen from behind. Figure 2 illustrates, in sectional aspect, the variations in the size of the ciliary processes and in the extent of the orbiculus ciliaris in the four quadrants of the eye. In figure 3 is shown the relationship of the ciliary region to the pigmented corneal margin.

A further point which these illustrations bring out is the fact that while in man the boundary line between the ciliary region and the retina forms a circle with a serrated edge—the ora serrata—in all the different animals examined this boundary presents a clear-cut edge, forming a sort of oval outline with a marked flattening on the inner side, produced by the nerve elements of the retina coming right forward to the bases of the ciliary processes. The reason of this retinal prolongation is to be found, I think, in the necessity of these animals possessing a large and extensive temporal field of vision to warn them of approaching danger from the flanks. The same extensive perimetry being unnecessary in the rest of the field of vision, the breadth of the blind region of the orbiculus ciliaris is elsewhere proportionately increased.

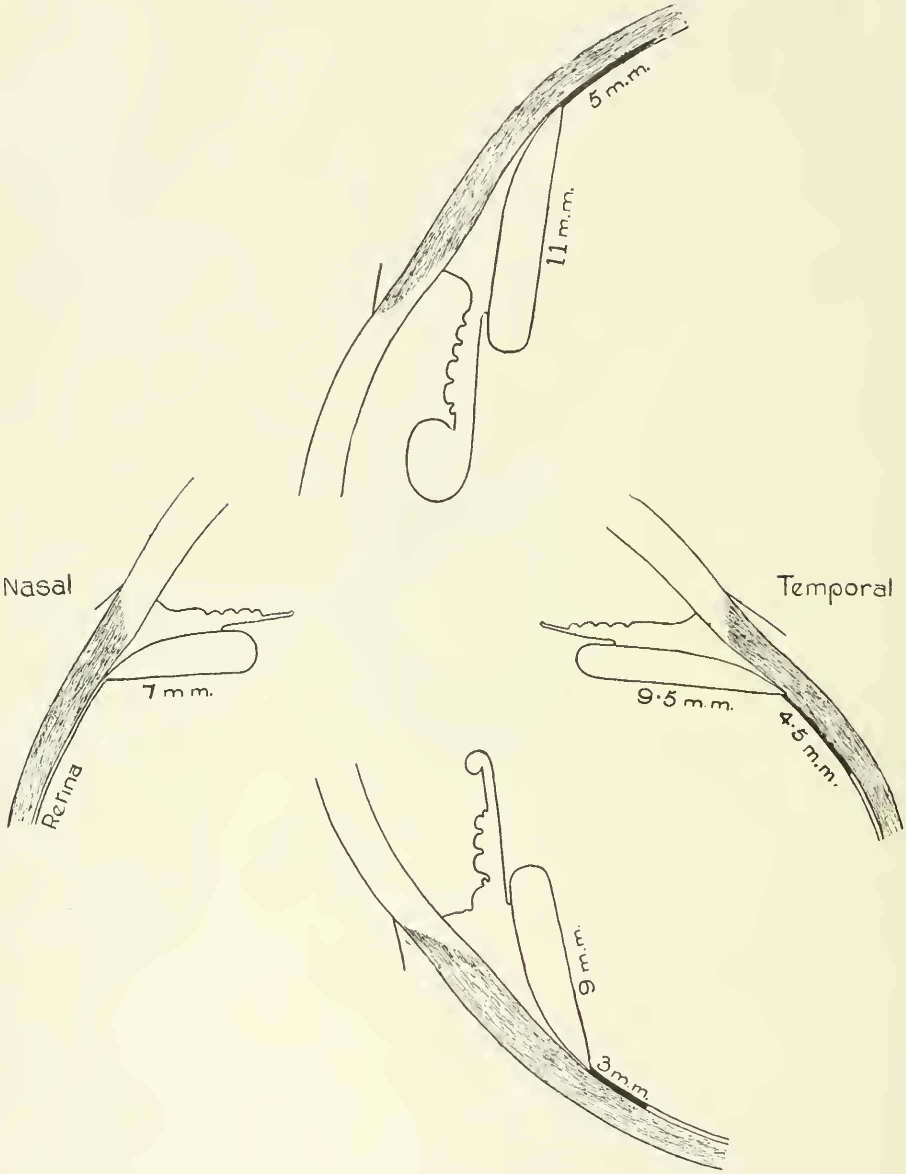

Fig. 2. Sectional aspect of the ciliary region in the horse. X 3.

The same eye as Fig. 1. Compare the size of the ciliary processes and also the extent of the region of the orbiculus ciliaris in the four quadrants. On the nasal side the retina extends forward to the base of the ciliary processes. Note on the superficial aspect of the corneo-scleral margin, the pigmented ring of the conjunctivæ shown in Fig. 3.

The absence in these animals of the orbiculus ciliaris on the nasal portion of the ciliary circumference raises the first objection to Helmholtz's theory of accommodation to which I would draw attention.

The prolongation forward of the retina on the nasal side cannot be a mere accident, but it must exist for a definite purpose, which if it be to extend the outer boundary of the field of vision, then it is inconceivable how the retina in this area can escape the traction of the ciliary muscle, as, according to Helmholtz's theory, it pulls the choroid forward in accommodation.

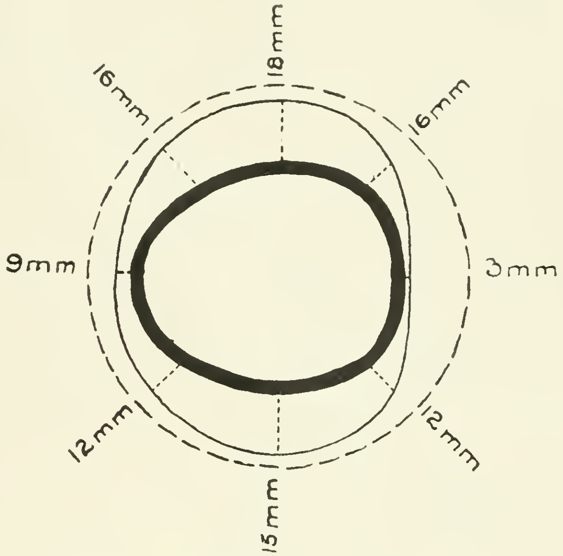

Fig 3. Anterior aspect of right eye of horse.

Natural size. The globe is shown in broken outline. The continuous line represents the position of the anterior limits of the retina to the inner edge of the pigmented corneal margin from which the measurements have been taken. Compare with Fig. 2.

The anatomical basis of Helmholtz's mechanism is furnished by the longitudinal disposition of the fasciculi of the ciliary muscle in these animals, and the absence in them of circular fibres such as are present in the human eye.

The longitudinal fibres alike in man and in animals are regarded as playing the part of a tensor choroideæ, which, by dragging forward the choroid, releases the zonular fibres from their state of tension (Fig. 4).

Now this mechanism naturally demands that, day in and day out, during not merely our wakeful, but also our sleeping, hours of existence, the vascular choroid must sustain the full weight of the elastic traction of the non-vascular lens. From this incessant pull, the choroid can have neither relief nor rest, but, on the contrary, in the act of accommodation, it is subjected to a still greater strain by being dragged forward by the ciliary muscle.

Now, when we bear in mind the vascular nature of the choroid, and the close attachment of the retinal pigment cells to the *lamina vitrea* of the choroid, as well as the fact that the retina is anatomically prolonged forwards as the *pars ciliaris retinæ*, it cannot reasonably be expected that these delicate and closely inter-related structures will passively tolerate such a constant mechanical strain without tending to undergo progressive yielding or other pathological changes.

It might, of course, be argued that the tissue of the orbiculus ciliaris, and not the choroid, supports the chief weight of the elastic traction of the lens, but, then, as has just been pointed out, the area of the orbiculus ciliaris, in at least six species of common domestic animals, is absent altogether on the nasal side, and therefore the retina is bound to be subjected to traction along with the subjacent choroid.

One can, however, hardly imagine this to be the case if the retina is specially prolonged forwards on the nasal side for the express purpose of increasing the temporal field of vision.

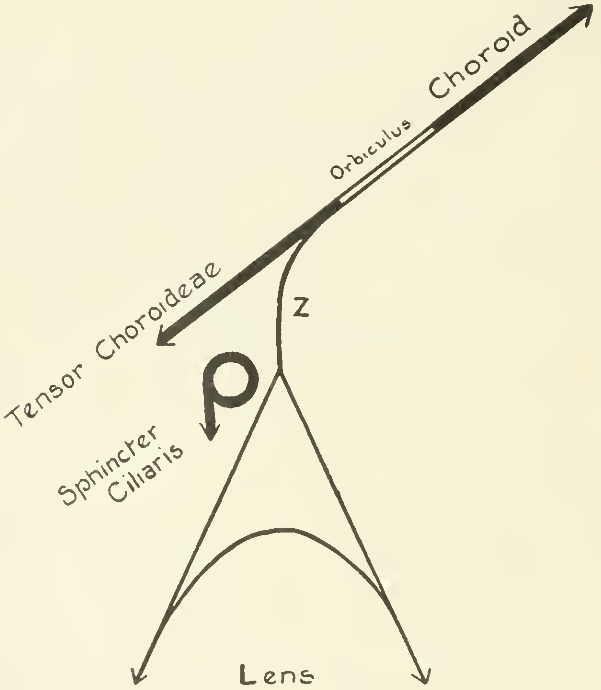

Fig. 4. Diagram of Mechanism of Helmholtz's theory of accommodation.

The ciliary muscle by acting as a tensor choroideæ pulls the choroid forward, and so diminishes the tension on the lens. This mechanism takes no note of the fact that the zonule (Z) does not run in a straight line but in a curve (See Fig. 5).

Further, what right have we to assume that in either man or animals the elasticity of the vascular choroid is more perfect and greater than that of the non-vascular lens ?

Helmholtz's mechanism implies this statement, as, in accommodation, the ciliary muscle is supposed to pull the choroid forward, and so turn the balance in favour of the lens. Thus, while in the position of rest the choroid has to support the elastic traction of the lens, in accommodation this strain is still further increased, and therefore it is obvious that Helmholtz's mechanism does not comply with Thoma's dictum that " whenever throughout the body a wall composed of soft parts is exposed to repeated high pressure, muscular elements are found and never elastic tissue alone."*

In direct contradiction to this generalization, the vascular choroidal tissue has, however, not only to withstand a constant dead weight of pressure or tension when at rest, but in accommodation, if Helmholtz's theory be correct, it has also to support repeated and often long-continued increased strain, and yet wherein lies its elastic tissue, far less its muscular elements to support such strain?

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* **Thoma, Richard.**—*Text-Book of General Pathology.* Translated by Alex. Bruce, 1896. p. 90.

Mechanical Fallacies of Helmholtz's Theory.

Important as the foregoing objections may be, they are, to my mind, insignificant and negligible in comparison with the difficulties raised by the purely mechanical aspect of Helmholtz's theory.

Any theory which sets out to explain mechanical action must certainly comply with known mechanical laws, yet in this respect Helmholtz's theory essentially fails.

Helmholtz's theory implies, as already noted, that the elasticity of the choroid is greater than that of the lens, and in consequence the lens is only released from its state of tension when the ciliary muscle by pulling the choroid forward turns the balance in its favour (Fig. 4).

The mechanical principles involved appear perfectly simple, but nevertheless they are altogether fallacious. Two elastic forces, choroid and lens, are acting against each other through the intermediary of the non-rigid zonule, and therefore this mechanical agency could only be in order were the zonula suspended in a straight line from the equator of the lens to the ora serrata, for then only could the elastic traction of the choroid be transmitted direct and unimpeded to the lens and *vice versâ*.

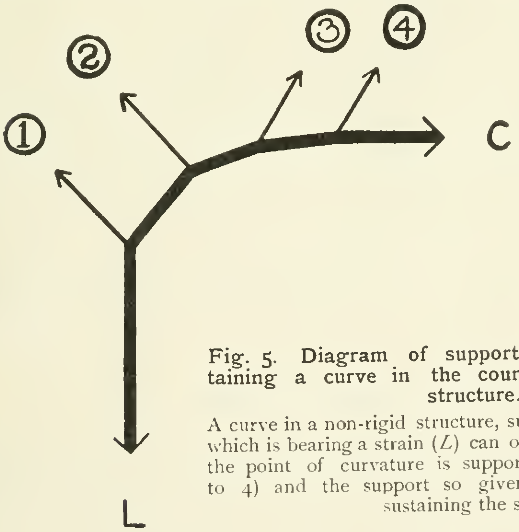

Fig. 5. Diagram of supporting forces maintaining a curve in the course of a non-rigid structure.

A curve in a non-rigid structure, such as a rope (*L C*) which is bearing a strain (*L*) can only exist so long as the point of curvature is supported (as by forces 1 to 4) and the support so given takes a share in sustaining the strain.

As it is, however, the zonule does not run in a straight line, but, as it passes from the lens backwards towards the orbiculus ciliaris, it presents a curve along its attachment to the ciliary body. This obvious, although unappreciated fact, is the point round which centres the whole question of the mechanical principles involved in accommodation.

In considering these principles, the one essential mechanical fact has been overlooked, that *a curve or bend in a non-rigid structure bearing a strain can only exist so long as the point of curvature is supported, and the support so given taking a share in sustaining the strain.*

If a rope carrying a weight is supported, as in Fig. 5, by forces 1 to 4, it is obvious that the bend in the course of the rope is maintained by these supporting forces of which 1 and 2 carry the greatest strain and 3 and 4 the least, while the strain borne by the distal extremity of the rope at *C*, diminishes in proportion to the sum total of the supporting forces at the bend of the rope. If the sum total of these supporting forces equals the downward stress at *L*, then no stress at all is imparted to the distal extremity of the rope *C*.

In such a mechanical arrangement, whatever the downward stress at *L* may be, there will always be maintained perfect stable equilibrium between this stress and the supporting forces irrespective of the weight *L*. That is to say, increase in the supporting forces acting in the direction of 1 and 2 will raise the weight *L*, while their diminution will lower it, but in either case perfect equilibrium will always be maintained.

The same mechanical principles apply *in toto* to the stress transmitted by the lens along the curvature of the zonule. This curvature is produced in consequence of the attachment of the zonular fibres to the ciliary body, and therefore it follows that the ciliary muscle, forming as it does the mass of the ciliary body, must assist in supporting the weight of the elastic traction of the lens.

After all, there is no getting away from the fact that the zonule, as the rope *L.C.* in Fig. 5, presents a curve, nor from the equally certain fact that such a curve in either zonule or rope must be supported or it could not exist.

If the weight *L* in Fig. 5 represents the stress of the elastic traction of the lens, and the supporting forces 1 to 4 equal this strain, it follows that none will be transmitted to the choroid *C*.

The supporting forces 1 and 2 naturally sustain the greatest strain, and if the portion of the rope lying between them represents the area of attachment of the zonule to the ciliary body proper, it is obvious that the ciliary body, *i.e.*, the ciliary muscle, must support the greatest weight of the elastic traction of the lens, leaving a diminished amount to be borne by the supporting forces 3 and 4, representing the region of the orbiculus ciliaris, while no strain at all will be transmitted to the choroid (At *C*).

As soon as the existence of a curvature in the course of the zonule is realised and the factors which assist in maintaining it are appreciated, it is manifest that Helmholtz's view of the ciliary muscle acting as a *tensor choroideæ* is untenable.

Author's Views of the Mechanism of Accommodation.

The view of the mechanism of accommodation which I would submit is that while in accommodation the lens is released from tension, yet this result is not brought about by a dragging forward of the choroid but by a descent of the zonular curve by which the ciliary muscle alone, and not the choroid, sustains the full weight of the elastic traction of the lens (Fig. 6).

To appreciate this mechanism, it is essential to bear in mind the mechanical laws respecting the transmission of forces along non-rigid and curved structures, while to substantiate the same it will be necessary to emphasize some of the main features of the anatomical disposition of the ciliary muscle. In man the ciliary muscle is recognised as presenting three clear and well-marked divisions:—(1) an inner composed of circular fibres, (2) an outer of longitudinal ones, while between them lie (3) fibres which tend to diverge in a radiating manner like the spokes of a half-opened fan.

In text-books these radiating fibres are erroneously described as radial fasciculi, from the position which they appear to occupy, in consequence of the detachment of the ciliary body which Müller's fluid produces (*Vide infra*).

The cribriform ligament is directly associated with all three divisions in the capacity of a check ligament to the circular portion, and of a ligament of origin to the rest of the muscle.* The longitudinal fasciculi of the ciliary muscle terminate in the stroma of the supra-choroidea and orbiculus ciliaris, while the radiating fibres find a direct insertion along the area forming the inner aspect of the ciliary body proper.

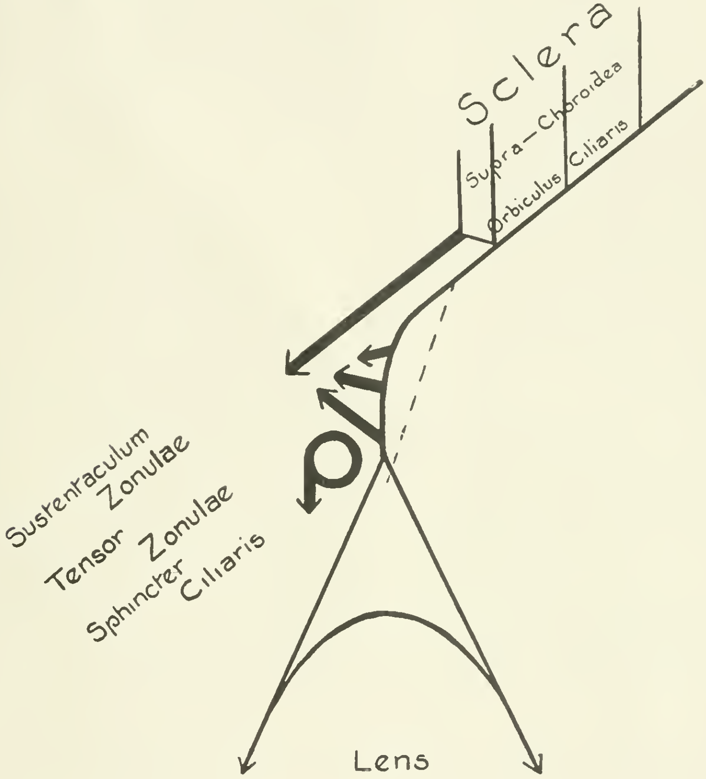

Fig. 6. Diagram of mechanism of Author's view of accommodation.

ANATOMY.—The zonule at its point of curvature is attached to, and therefore supported by, the ciliary body. Each of the three anatomical divisions of the ciliary muscle has a specific *rôle* : (1) The circular fibres act as a *sphincter ciliaris*. (2) The radiating fasciculi from their position support the zonular curve as a *tensor zonulæ*. (3) The longitudinal fibres terminate in the stroma of the supra-choroidea and orbiculus and act as a *sustentaculum zonulæ* to the distal extremity of the zonule. MECHANISM.—In positive accommodation the zonular curve is lowered (dotted line) by contraction of the sphincter ciliaris (circular fibres) associated with simultaneous relaxation of the radiating fibres of the tensor zonular. In negative accommodation the now relaxed tensor contracts and raises the zonular curve and the sphincter relaxes. The sustentaculum zonulæ (longitudinal fibres) plays throughout a more passive part, as it merely supports the orbiculus ciliaris, and this prevents any strain being transmitted to either choroid or retina. In quadrupeds the circular sphincter fibres are absent, but otherwise the principles of the mechanism are the same.

Thus the longitudinal fibres are associated with the distal extremity of the zonule, while the radiating fibres are associated with the summit of the zonular curvature (Fig. 6).

***Glaucoma.**—An inquiry into the physiology and pathology of the intra-ocular pressure, pp. 23 and 32. Also THE OPHTHALMOSCOPE, 1908, Vol. VI, p. 746.

From the existence of a curve on the course of the zonule, as well as from the relation of the termination of the radiating fibres of the ciliary muscle to this curve, it is mechanically impossible to imagine that the ciliary muscle can act as a single muscle to pull the choroid forward.

A bend such as the zonule presents can only exist because of the support it receives at the point of curvature from these radiating fibres of the ciliary muscle, and their contraction must tend to increase the tension of the zonule by pulling its curve outwards while the circular fibres operate inwards and therefore produce relaxation. These two sets of muscle bundles thus act in opposite directions and behave like any other pair of opposing muscles by controlling and counteracting each other's movements. The circular fibres act as a *sphincter ciliaris* producing relaxation of the zonule, while the longitudinal and radiating fibres act as antagonists in the respective capacity of *sustentaculum* and *tensor zonulæ.*

In positive accommodation the tension of the lens is diminished in consequence of a lowering of the zonular curve induced by a simultaneous action of relaxation on the part of the *tensor zonulæ* (radiating fibres) and of contraction on the part of the *sphincter ciliaris* (circular fibres).

Per contra contraction of the now released tensor fibres with relaxation of the ciliary sphincter brings about negative accommodation.

In brief, the view of the mechanism of accommodation which I suggest is that the *sphincter ciliaris* (circular fibres) contracts as the *tensor zonulæ* (radiating fibres) relaxes and *vice versâ*; each antagonist working in harmonious association with its opponent in regulating the amount of tension of the zonular arc.

The *rôle* of the longitudinal fibres is a passive one, as they merely assist in supporting such traction as the zonule might impose on the orbiculus ciliaris of the ciliary region. By thus acting as a *sustentaculum zonulæ* these muscle fibres prevent any strain being transmitted to either choroid or retina. Thus this arrangement conforms with Thoma's dictum already quoted, that "whenever throughout the body a wall composed of soft parts is exposed to repeated high pressure, muscular elements are found, and never elastic tissue alone."

That the longitudinal and radiating fasciculi of the ciliary muscle must support the zonular curve is demonstrated by the appearance presented by the ciliary region in globes fixed in Müller's fluid in comparison with those in which formalin has been used.

After fixation in Müller's fluid, the ciliary body appears detached, as if rotated round an axis represented by the scleral ring. This appearance is produced by a buckling in of the orbiculus ciliaris and a collapse of the zonular curve. The lens, too, presents a much more globular shape than in a formalin fixed eye, in which as a contrast the ciliary body invariably retains its position and the lens appears thinner and flatter.*

These changes are due to the fact that Müller fluid is a very slow fixing reagent, which takes six weeks at least to harden a globe, while twenty-four hours is sufficient even for a 2 per cent. formalin solution, which is the strength I always employ. Formalin simultaneously kills and hardens the tissue cells, while with Müller's solution the structures are not fixed till after the death of the tissue cells.

Thus, the muscular fibres of the *sustentaculum* and *tensor zonulæ* are killed in Müller's fluid before being fixed, and, therefore, by losing their vital and natural elasticity incur in this state the full force of the yet unfixed lens capsule. In consequence, the muscular tissue is forced to give way, and the ciliary body becomes detached, while the muscle bundles, particularly the radial fasciculi, present a teased-out appearance.

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* *Op. cit.* Figs. 2 and 3.

In a formalin hardened globe, on the other hand, the muscle fibres are killed and fixed simultaneously, and hence the ciliary body retains its position, and the muscle bundles appear in compact and closely arranged fasciculi.

Formalin also acts with equal rapidity on the lens, which appears thinner and flatter than after hardening with Müller's fluid, in which latter reagent the elasticity of the lens capsule has full play before fixation takes place, and therefore the lens presents a rounder shape.

Thus, formalin hardens the eye with the zonular curve well preserved, so that the mechanism of accommodation is fixed in the position of rest, while Müller's fluid hardens the eye only after the lens capsule has expended its full elastic energy in detaching the ciliary body and flattening out the zonular curve, and hence the lens assumes a more globular form, as in accommodation.

In the mechanism which I have suggested it will be noted that during negative accommodation, *i.e.*, when the eye fixes from a near to a distant point, the *tensor zonulæ* contracts into a position of rest, and its fibres remain in a contracted state when the eye is at rest, as, for instance, during sleep.

The fibres of the *tensor zonulæ* behave in exactly the same manner as the non-striped muscle layers of the stomach, bladder, rectum, etc., which likewise contract into a position of rest. By thus contracting and remaining in a phase of rest the *tensor zonulæ* is placed in the best possible position to withstand the constant strain of the tension of the lens, for, as is well recognised, contracted muscle fibres possess of all tissues the highest degree of elasticity, which is more than can be said of the choroid, the elasticity of which is purely conjectural.

It is important to remember that it is the physiological function of non-striped muscle fibres to contract into a phase of rest as opposed to striped muscle fibres which contract into activity, although, according to Helmholtz's theory, there is no reason why the ciliary muscle should be composed of non-striped fibres, as they are considered, in their mode action, to contract into activity like ordinary skeletal muscles.

When the bladder fills up, its non-striped muscular wall relaxes, and micturition is brought about by a voluntary relaxation of the sphincter associated with simultaneous contraction into a phase of rest of the non-striped fibres comprising the walls of that viscus.

Similar harmony exists in the human eye between the action of the sphincter ciliaris and its opponent muscle the tensor zonulæ.

Now, although quadrupeds do not possess circular fibres, yet the anatomical and mechanical principles of accommodation are otherwise the same as in the human eye, as illustrated in Fig. 6, if we delete the sphincter ciliaris.

In both man and animals the essential factor is the relationship of the ciliary muscle with the point of greatest curvature of the zonule, in consequence of which relaxation of the non-striped muscular fibres lowers the zonular curve and so bring about accommodation, while their contraction into a phase of rest brings the whole mechanism to repose.

It is impossible, within the compass of a single article, to discuss the subject of the mechanism of accommodation in all its bearings, and, therefore, while admitting that the evidence here brought forward is by no means complete, yet I think it is sufficient to warrant a readjustment of current views respecting the mechanism by which the lental changes in accommodation are brought about.

Appendix relating to the Comparative Anatomy of the Ciliary Region.

The following points hold good in the case of all the six species of domestic animals examined : horse, cow, sheep, pig, dog, and cat.

(1). The region of the orbiculus ciliaris tends to be more extensive above than on either temporal or inferior quadrants of the ciliary circumference.

(2). On the nasal side there is invariably a complete absence of the orbiculus ciliaris and the retina comes forward as far as the bases of the ciliary processes.

(3). The ciliary processes in the nasal quadrant are always the smallest in size and more numerous than in the other segments.

(4). The ciliary processes in the superior quadrant are relatively the largest in the ciliary circumference.

(5). The boundary line between the ciliary region and retina, instead of forming a circle with a jagged edge—the ora serrata—invariably presents a clear-cut margin with a more or less oval outline.

(6). Unlike the case in the human eye, the diameter of the lens in these animals always exceeds the diameter of the ring formed by the apices of the ciliary processes. As the apices of the processes lie in front of the equator of the lens, the diameter of the ciliary ring can only be measured after the removal of the lens.

Horse.

(See Figs. 1, 2, and 3).

As is to be expected, the dimensions of the globes of fully-developed horses varied within quite considerable limits.

The cornea also showed considerable variations, as the largest specimen examined presented a transverse diameter of 36 mm. and a vertical one of 29 mm., while the smallest cornea had a transverse diameter of 32·5 mm. and a vertical one of 24·5 mm.

Around the margin of the cornea there is a superficial pigmented line, about 2mm. in breadth, from the inner edge of which the measurements were taken (Fig. 3).

The number of ciliary processes varied from a minimum of 95 to a maximum of 110.

I have not been able to make out any correlation between the total number of ciliary processes present and the size of the globe, or the diameter of the cornea, lens, or ciliary ring (*i.e.*, the circle) formed by the apices of the ciliary processes.

The following table is taken from a typical globe :—

	Ciliary region.	Ciliary processes.	Orbiculus ciliaris.	No. of ciliary processes.
Superior quadrant	16·0 mm.	11·0 mm.	5·0 mm.	26
Temporal quadrant	14·0 mm.	9·5 mm.	4·5 mm.	24
Inferior quadrant	12·0 mm.	9·0 mm.	3·0 mm.	20
Nasal quadrant	7·0 mm.	7·0 mm.	*Nil.*	39

	Diameters of globe.	Diameters of cornea
Transverse	54·0 mm.	35·0 mm.
Vertical	50·5 mm.	28·5 mm.
Antero-posterior	44·0 mm.	—

The diameter of the lens was 19 mm., while that of the ciliary ring was 0·5 mm. less.

Cow.

The diameters of the globe and of the cornea naturally also presented considerable variations. The number of ciliary processes varied from 92 to 110. In the cow the pigmented margin in the cornea, at any rate in my specimens, was not nearly so pronounced as in the horse.

The following table is taken from a typical globe :—

	Ciliary region.	Ciliary processes.	Orbiculus ciliaris.	No. of ciliary processes.
Superior quadrant	10·5 mm.	6·0 mm.	4·5 mm.	24
Temporal quadrant	9·0 mm.	6·0 mm.	3·0 mm.	23
Inferior quadrant	7·5 mm.	6·0 mm.	1·5 mm.	22
Nasal quadrant	5·5 mm.	5·5 mm.	*Nil.*	30

	Diameters of globe.	Diameters of cornea.
Transverse	42·0 mm.	29·0 mm.
Vertical	42·0 mm.	24·0 mm.
Antero-posterior	37·0 mm.	—

The diameter of the lens was 19 mm., while that of the ciliary ring was 18·5 mm.

Sheep.

The dimensions of the cornea ranged from a transverse diameter of 24 mm. and a vertical one of 18 mm., to a transverse diameter of 22 mm. and a vertical one of 16 mm. The number of ciliary processes in the eyes examined varied from 89 to 96.

The following table is taken from a typical globe of a two-year old sheep

	Ciliary region.	Ciliary processes.	Orbiculus ciliaris.	No. of ciliary processes.
Superior quadrant	8·5 mm.	5·5 mm.	3·0 mm.	24
Temporal quadrant	8·5 mm.	5·5 mm.	3·0 mm.	22
Inferior quadrant	7·5 mm.	5·5 mm.	2·0 mm.	20
Nasal quadrant	4·0 mm.	4·0 mm.	*Nil.*	28

	Diameters of globes.	Diameters of cornea.
Transverse	34·0 mm.	25·0 mm.
Vertical	33·0 mm.	18·5 mm.
Antero-posterior	31·0 mm.	—

The diameter of the lens was 15·5 mm. and that of the ciliary ring was 15 mm.

Pig.

The pigs from which the eyes were taken were about one year old. The diameters of the globe varied from a transverse diameter of 26 mm. and a vertical one of 25 mm., to a transverse diameter of 25 mm. and a vertical one of 23·5 mm. The number of ciliary processes ranged from 78 to 85.

The following table is taken from a typical globe :—

	Ciliary region.	Ciliary processes.	Orbiculus ciliaris.	No. of ciliary processes.
Superior quadrant	5·5 mm.	4·0 mm.	1·5 mm.	20
Temporal quadrant	5·0 mm.	4·0 mm.	1·0 mm.	19
Inferior quadrant	5·0 mm.	4·0 mm.	1·0 mm.	19
Nasal quadrant	3·0 mm.	3·0 mm.	*Nil.*	24

	Diameters of globe.	Diameters of cornea.
Transverse	25·0 mm.	15·5 mm.
Vertical	24·0 mm.	12·5 mm.
Antero-posterior	22·0 mm.	—

The diameter of the lens was 10 mm., and that of the ciliary ring 9·5 mm.

Dog.

The measurements given here are taken from a three-year old foxhound.

	Ciliary region.	Ciliary processes.	Orbiculus ciliaris.	No. of ciliary processes.
Superior quadrant	6·0 mm.	5·0 mm.	1·0 mm.	20
Temporal quadrant	6·0 mm.	4·0 mm.	2·0 mm.	19
Inferior quadrant	5·0 mm.	4·0 mm.	1·0 mm.	17
Nasal quadrant	4·0 mm.	4.0 mm.	*Nil.*	24

	Diameters of globe.	Diameters of cornea.
Transverse	26·0 mm.	17·0 mm.
Vertical	25·0 mm.	16·0 mm.
Antero-posterior	23·0 mm.	—

The diameter of the lens was 12 mm. and of the ciliary ring 11·5 mm.

Cat.

The following table is taken from a typical globe :—

	Ciliary region.	Ciliary processes.	Orbiculus ciliaris.	No. of ciliary processes.
Superior quadrant	5·5 mm.	3·5 mm.	2·0 mm.	18
Temporal quadrant	5·5 mm.	3·0 mm.	2·5 mm.	18
Inferior quadrant	5·0 mm.	3·0 mm.	2·0 mm.	17
Nasal quadrant	3·0 mm.	3·0 mm.	*Nil.*	22

	Diameters of globe.	Diameters of cornea.
Transverse	21·0 mm.	16·0 mm.
Vertical	21·0 mm.	15·5 mm.
Antero-posterior	20·0 mm.	—

The diameter of the lens was 13 mm., while that of the ciliary ring was 0·5 mm. less.

Superior Quadrant.

Total extent of ciliary region .... 16 mm.
Comprising (a) ciliary processes .... 11 mm.
(b) orbiculus ciliaris .... 5 mm.
Number of ciliary processes 26.

Nasal Quadrant.

Total extent of ciliary region.... ....7 mm.
Comprising (a) ciliary processes......7 mm.
(b) orbiculus ciliaris......Nil.
Number of ciliary processes ....39.

Temporal Quadrant.

Total extent of ciliary region ......14 mm.
Comprising (a) ciliary processes...9·5 mm.
(b) orbiculus ciliaris ...4·5 mm.
Number of ciliary processes.........24.

Inferior Quadrant

Total extent of ciliary region .... 12 mm.
Comprising (a) ciliary processes .... 9 mm.
(b) orbiculus ciliaris . ... 3 mm.
Number of ciliary processes 20.

CLINICAL MEMORANDA.

OPTICAL TREATMENT OF SUPERIOR RECTUS PARESIS.

BY

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PRISMS given for the relief of incurable paralysis of the ocular muscles are unsatisfactory, as the amount of deviation is not fixed; the more the patient attempts to look towards the paralysed side, the greater is the deviation, so that no prism can correct the deviation for all directions of the eyes. The following is a case in which I obtained more satisfactory results than I expected.

A.B. with congenital paresis of the left superior rectus and slight ptosis was sent to me by a friend. On being tested with Maddox' rods he showed slight right hyperphoria even when looking down; on looking up, when the left superior rectus failed to act, there was marked vertical diplopia.

The amount of the deviation was variable, and depended apparently upon his general physical condition. I first ordered him a prism edge up before his right eye to correct the hyperphoria, and a wafer prism $(+5^{\nabla})$ edge down to be cemented on to the upper half of his left glass. This was unsatisfactory, as on raising his eyes just above the horizontal plane, he of course saw double as he then was viewing objects through a prism that corrected his deviation only when his right eye was raised 23°.

What was wanted was a variable prism that would have a greater effect the more upwards his eyes were directed. Clearly a concave cylindrical lens would do this if cut through the middle. Fortunately, he had sufficient elevating power in his left eye to enable one to apply this device to the upper part of his left glass. A concave cylinder of -5D was divided at the line of its plane axis, and its thin edge was regarded as the edge of a variable prism. This was then cemented edge down to the upper half of his left glass, so that it presented somewhat the appearance of a split bifocal. I warned the patient that his vision with this cylinder would be extremely defective in his left eye when he raised his eyes above the horizontal plane, and I feared that this would prevent this device being satisfactory.

However, he has now worn the glasses for more than two months and he professes himself to be delighted with them. The dividing line does not trouble him in the least, and he has no diplopia in any part of the field of vision. Of course, a weaker cylinder would have served the purpose if placed before the right eye, but then it would have been necessary to place it base downwards on the upper part of the right glass, and this would have caused him trouble on passing the horizontal dividing line.

The calculation of the cylinder required is interesting; in this case, I found that when he viewed an object 10° above the horizontal plane he had a diplopia that was just corrected by a 2∇ prism, whereas when the object was raised 23° above the horizontal plane he required a 5∇ prism. Now remembering that the centre of motility is 27 mm. (or k) behind the plane of the spectacles, we find that when his right eye was raised 10°, his left eye was raised $10^\circ - 2\nabla$ or $8^\circ\ 51'$, so that its fixation line must have been traversing a point k tan $8^\circ\ 51'$ or $27 \times \cdot 1557$ or about 4·2 mm. above the mid-line of the lenses. On using the formula $N - \frac{lD}{10} \nabla$ we find that $D = \frac{10N}{l} = \frac{20}{4.2} = 4.76$, so a concave cylinder of -4.76D. would be required. When the right eye was raised 23° the left eye was raised $23^\circ - 5\nabla = 20^\circ\ 8'$, so that his left fixation line traversed a point 9.9 mm. above the mid-line, so for this amount of elevation $D = \frac{10N}{l} = \frac{50}{9.9} = 5{\cdot}05$D. We see that a -5D. cylinder would practically serve the required purpose, and the satisfactory result justifies our experiment.

A METHOD OF DETERMINING THE MUSCLE BALANCE AT THE READING DISTANCE*

BY

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FOR several years I have noticed that in some cases the adduction and abduction at the reading distance, when secured by square prisms and Graefe's "dot and line," were difficult to obtain accurately, owing to inability of the patient to keep the focus. In testing my own muscles, I could get a number of readings, any one of which might be correct, because I was unable to tell just when the dot was out of focus. A little more accommodation enables one to overcome a stronger prism when determining the adduction. After experimentation, I devised a modification of Graefe's "dot and line," which meets every requirement, *viz*: the "circle and line."

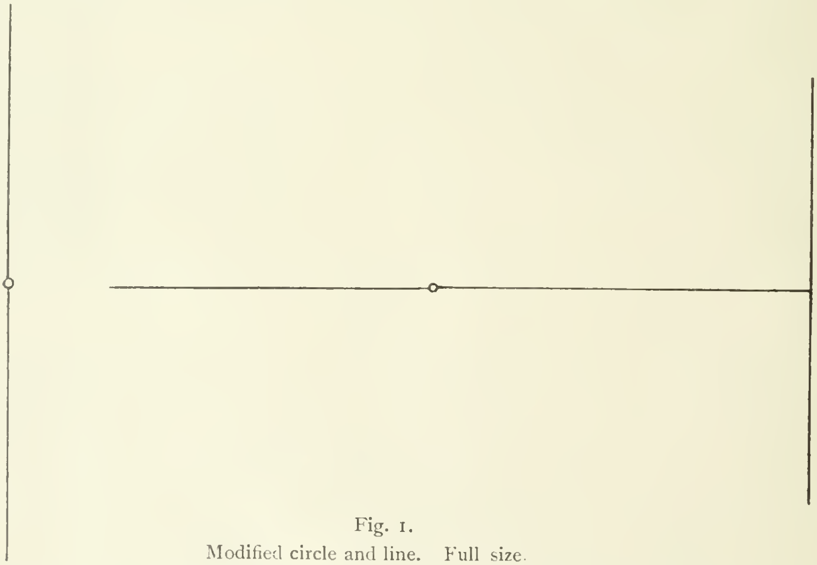

Fig. 1.
Modified circle and line. Full size.

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*Read before the Society of Ophthalmologists and Optologists, Washington, D.C., April, 21st, 1911.

The patient holds the card with line vertical at the reading distance, and is instructed as to about where the displaced image will appear when a prism, base out, is placed before one eye; to tell me whether the two images are level, that I may correct any deviation in that regard; and he is told to fuse the two circles without losing sight of the white centre in the circle. The slightest variation of accommodation makes the circle look like a dot of ink. It is impossible for an untrained observer, such as is a patient, to determine when the dot and line are exactly in focus, but the ordinary patient can tell easily the difference between a white centred circle and a black dot.

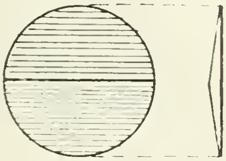


Fig. 2
Double prism (*reduced*).

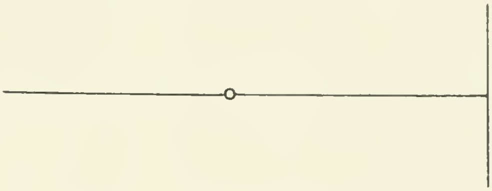


Fig. 3
Modified circle and line (*reduced*).

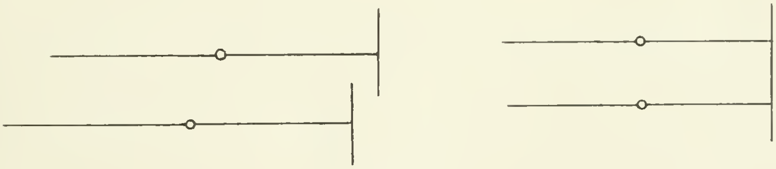
Now, as to the *deviation* at the reading distance.

In testing the esophoria and exophoria, two things are imperative:

(1) To have the eyes focussed sharply on the chart; and

(2) To break up absolutely the tendency to fusion.

With the Maddox rod and point of light, the accommodation may waver a little either way and be unnoticed. With the dot and line or the circle and line, and a 10-degree prism, base down, before one eye, there is often considerable attempt at lateral fusion; it is a common experience for the lines, as the patient views them, even with sharp focus, to be in the position of exophoria to waver, and after a few seconds to form a continuous line, with one dot directly above the other, *i.e.*, no lateral deviation can be demonstrated. Therefore, neither of the tests in common use answers perfectly the above conditions of focus and no tendency to fusion.


Figs. 4 and 5
Appearance of lines before and after adjusting prisms to a level.

I now propose to you, as the most accurate means of which I have knowledge, the double prism, similar to Savage's (Fig. 2), used with the modified circle and line held horizontally (Fig. 3). It consists of two 7-degree prisms, the base of one to the base of the other, mounted in a ring to fit a trial frame.

The use of this prism at 20-feet with the candle, which is one of the recognized tests at that distance, is inferior to the Maddox rod and candle, but this prism at the reading distance, with the circle and line held horizontally, is superior to any other test with which I am familiar.

While using the test for torsion of a horizontal line looked at through the Maddox prism, the adaptation of this idea to the vertical and lateral *deviation* occurred to me.

Place the double prism, base up and down, in the left side of a trial frame properly centered on the face. The patient is asked to close the right eye and to raise and lower the test card until two horizontal lines are seen. Then, turn the prism until the vertical black lines at the end of the horizontal ones. form a continuous line. In other words, adjust the prisms to a level position,

The right eye is now opened, and the patient sees three lines, the right eye seeing a line situated between the other two. There is and can be little or no attempt to fuse the images, owing to their nature and their displacement. The focus is exact because of the circle, which will appear to be a black ink dot if the least out of focus. If the central line is not half-way between the upper and lower lines, there is a hyperphoria, which can be measured by the prism necessary to bring the line to a midway position.

If an imaginary straight line will pass through all three circles, there is no lateral deviation (Fig. 6). Ask the patient if a straight line will so pass, or if the lines necessary to connect the circles form an angle with apex to the left or right (Figs. 7, 8); then place prisms before one eye until the circles are in the same line.

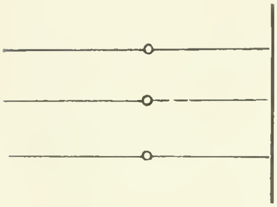


Fig. 6

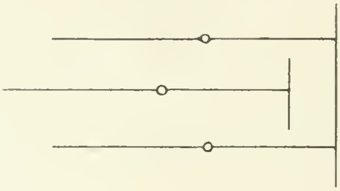


Fig. 7

(Exophoria)

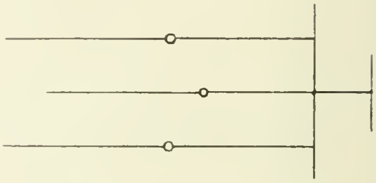


Fig. 8

(Esophoria)

I find no trouble at all in the clinical application of the above to the average patient, and it takes less than a minute more than the older and inaccurate tests.

For a year past I have been using this as a routine test on all refraction cases in my office, and the results show decidedly that exophoria at the reading distance is the rule rather than the exception. To be sure, the majority of the cases tested in the office wished relief from asthenopia; but that glasses cured the most of these demonstrates that imperfect extraocular muscle balance played no part in the symptoms. Therefore, for the purposes of this paper, they may be called non-asthenopic. However, to make more certain the conclusions regarding the test, through the courtesy and with the assistance of Capt. W. T. Davis, of the Army Medical Corps, the eyes of twenty-five non-asthenopic men, soldiers at Fort Meyer, were examined by the above tests and by the Graefe dot and line. Almost without exception, they showed exophoria of from one to five degrees, at a convergence of three meter angles, with an average of about three degrees. The Graefe dot and line test showed lateral deviation in but four of the twenty-five men. Perhaps one-third of all cases will show a vertical deviation of from one-half to two degrees, which the classical tests do not attempt.

Lucien Howe, in his recent excellent work on the Muscles of the Eye (Vol. I, p. 305), states: " An examination of the non-asthenopic eyes of the 103 persons just referred to showed that perfect muscle balance at the near point of three meter angles was present in a fraction over 93 per cent. This is a very much larger percentage than that in which we find orthophoria at the far point. Moreover, the greater the degree of accommodation and convergence, up to the limit of a comfortable working distance, the more constantly do we find perfect muscle balance."

But his tests were made with Graefe's dot and line, and prism base down, in which test there remains a great deal of the fusion tendency. The tests described in this paper prove that exact muscular balance at the reading distance is rare, and that exophoria of from three to five degrees is the rule and must be considered normal.

TRANSLATION.

ON THE MECHANISM OF ACCOMMODATION.*

BY

PROFESSOR J. STILLING,

OF STRASSBURG, GERMANY.

(Abridged Translation.)

I.—Prefatory Remarks.

WHOEVER studies the researches of von Helmholtz upon accommodation with an unprejudiced mind, can come to no other conclusion than that this great scientist intended to give only a provisional explanation of its mechanism with no pretention to absolute accuracy. His entire theory is comprised in the following sentences:—

"Such changes in form of the lens as my measurements have revealed could not take place without the aid of other forces. The lens could not possibly become thicker in consequence of the hydrostatic pressure upon its posterior surface and edges. Such pressure would tend to arch the equatorial surface of the lens forward, and to make it flatter. A suggestion which appears to solve these difficulties is that the lens in its resting far-sight condition is stretched by the zonula which is attached to its periphery. The folds of the zonula run from their attachment to the lens capsule outwards and backwards, thus forming the sheath of the ciliary body, and they eventually fuse with the vitreous, retina, and choroid, at the posterior edge of this structure. When the ciliary muscle contracts, it can bring the posterior end of the zonula towards the anterior part of the lens, and so diminish the tension of the zonula. The lens must, however, be stretched in its equatorial diameter by the tension of the zonula, its axis must be shortened, and its surface must be rendered flatter. When, during accommodation for near objects, the drag of the zonula is lessened, the equatorial surface of the lens must become smaller, its centre thicker, and the concavity of both surfaces become more pronounced."

It is obvious that the anatomical phenomena upon which this apparently absolutely provisional hypothesis rest are very indefinite and incomplete. Neither the quality of the lens and the zonula, nor the anatomy of the ciliary muscle, are sufficiently considered by it, whereas the most important structure of all—namely, the vitreous body, is absolutely and entirely neglected. In process of time, the hypothesis became a veritable dogma to the pupils of the great master, accepted, it is true, without much conviction. Javal was absolutely correct when he described this dogma as one which "we have all learned, but never comprehended," a thing which, by the way, can be said of

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*Ueber den Mechanismus der Akkomodation, from *Zeitschrift für Augenheilkunde*, Januar, 1911.

most dogmas. In some degree the theory must have been considered to be tottering when Heine discovered that the cadaveric lens was not adjusted for near vision, but on the contrary, had an obviously flat curvature. All the same, this investigator openly held the opinion that even in the dead eye, the zonula could be still in tension, for when he divided it he perceived the convexity of the lens increase, and in this saw a confirmation of Helmholtz's hypothesis.

The researches of Hess seemed to prove completely that the zonula loosened during accommodation. Hess was surprised to find that the zonula became so lax that the lens shook (Coccius had only found that it trembled) and influenced by its weight, sank, almost falling into the zonular space. It might have been suggested that this oscillation of the lens would render such an accurate accommodative adjustment of little value, but no one pointed out this objection to the theory.

Hess' interesting research seemed to confirm the flaccidity of the zonula, and consequently of the lens capsule during accommodation.

The question, however, was placed in a different light by the astonishing, and, in many respects, epoch-making discoveries of Tscherning, who, with Schoen, had for a long time doubted and combated the teaching of Helmholtz. Tscherning ascertained that Helmholtz had been led into error by the determination of Pourfour du Petit, who, using methods which, although wonderful for the time, were absolutely inadequate, had accepted a curvature for the lens in the dead eye which was much too convex. He made the further astonishing discovery, rescuing the researches of Thomas Young from oblivion, and confirming his results by a new method of measurement invented by himself, that the curvature of the lens during accommodation *only increases in the centre of its superficial area, becoming in fact actually less at its periphery*, and that, thererefore, increase in the spherical aberration does not take place, as it obviously must, if the truth of Helmholtz's theory be accepted. Tscherning urges with truth against Heine that there is no question of a division, but of a loosening of the zonula, that in spite of the *division* the increase in convexity which takes place in Heine's experiment is much too small to account for the true range of accommodation. Hess's observations were absolutely correct: the conclusions which he deduced from them were incorrect. As a matter of fact, no one has ever seen the lens sink, and the phenomenon seen by Hess can be explained in another way. The oscillation of the lens must be referred to contractions of the ciliary muscle, an explanation which has already been suggested by Coccius.

Helmholtz's theory, if not actually destroyed by Tscherning's researches, is at least shaken to its foundations. The question whether the alternative theory put forward by Tscherning offers a satisfactory explanation of the mechanism must be answered in the affirmative.

Tscherning has undoubtedly made a great advance upon the views held by the upholders of the older hypothesis, for he has urged energetically that the vitreous is an organ and not a bag filled with water, in which the lens hangs from the zonula, and to which, according to Hess, it is insufficiently attached. But while admitting Tscherning's services, it is allowable to add that he shows himself to be more a physiologist than an anatomist. The anatomical examination of those parts of the eye which are most important for accommodation must form the basis of all knowledge of the physiological processes, for the correct presentation of the action of any mechanism must rest upon a correct appreciation of its structure.

The following consideration of the mechanism of accommodation takes its stand upon this point of view.

2.—The Transparent Nucleus of the Eye.

The optical nucleus of the eye consists of lens, zonula, and vitreous. These are anatomically most intimately associated. The complete transparent nucleus can, by careful dissection, be easily separated from the rest of the eye; after a short self-maceration or immersion in dilute alcohol, the process of dissociation is almost automatic. The anatomical examination which bears the closest relationship to the physiological behaviour of the part must primarily be macroscopic. The neglect of pure anatomical dissection in favour of microscopic methods is responsible for the fact that certain conditions are overlooked which are essential to the correct comprehension of physiological processes. In the youthful eye, which alone possesses good accommodation, the lens consists of a soft, easily moulded, but almost entirely inelastic substance. When this lack of elasticity is considered it seems absurd to suppose that its change of shape can be influenced by internal physiological forces; its part can only be a purely passive one; pressure from without must determine movement of its substance, and this movement must be compensated. This compensation must be ascribed to the elasticity of the capsule. The elasticity of the capsule is easily demonstrated, for when cut it rolls outwards. Nevertheless, too great a value must not be ascribed to the elasticity of the capsule. If one completely separates the lens of a young animal from its connection with the zonula and vitreous, it is true that it alters its shape slightly, becoming a little more spherical. But all the time it preserves its characteristic shape which varies in different species. The lenses of many birds possess most remarkable flat parallelopipedal forms, as in the martlet. The lens of the chamois has one surface quite flat, so here no great convexity can be produced by the elasticity of the capsule even when it is perfectly free. The lenses of certain birds of prey (for example, *Astur palumbarius*) possess very peculiar small conical elevations in the centre of the surface of the lens; in short, the lens assumes the greatest variety of characteristic shapes. If the elasticity of the capsule were really as great as the supporters of Helmholtz's hypothesis assume, then the lens, when separated from its attachments, must always approximate to the spherical form, and the more so the greater the range of accommodation. Instead of this we find that in fishes, whose accommodation is not caused by change of form but by change of position of the lens, the lens is spherical, whereas in birds, which possess excellent power of accommodation, the most marked departure from the spherical form can be found.

We can only decide after a study of the comparative anatomy of the lens that the influence of the elasticity of the capsule upon the form of the lens is not very great. As long as the lens preserves its attachments, the tension of the surrounding structures must exercise a certain influence upon the tension of the capsule, which ceases as soon as the lens is isolated; but it cannot be sufficiently great to account for the alterations in the curvature of the lens in accommodation. Tscherning has discovered that the increase in convexity of the lens which follows Heine's division of the zonula is wholly insufficient to account for accommodation. But as the real question is not a division of the zonula but a mere loosening, it is obvious that it is even less capable of explaining accommodative change.

The anatomical structure of the vitreous is just as important as, or more important than that of the lens.

Since it has become usual to study the anatomy of the eye by serial sections and to use the microscope exclusively, the opportunity for seeing things which are visible only in pure anatomical dissections has been lost—structures which can be studied with the naked eye or with a simple lens. Most authors regard the vitreous as though it were a ball or sac distended with water, or at any rate a sponge-like structure, or at best as a kind of stuffing for the inside of the eye. Tscherning and T. P. Anderson Stuart have combated this erroneous idea. Schoen realised that the vitreous played an important part, but it is doubtful if even he had an adequate acquaintance with the anatomy of the structure.

The vitreous is, indeed, no stuffing and is not a sac full of water, but a real differentiated organ very varied in different species of animal and even in isolated classes. That the vitreous is a real organ nothing is more convincing than the study of a simple anatomical dissection of a bird's eye, especially of the telescopic eye of the birds of prey, as, for example, the owl. It is in this case easy by a careful dissection with forceps and scissors to detach the entire transparent nucleus of the fresh eye, because the lymph space between sclera and choroid is very well developed in birds' eyes; only a little pigment and parts of the *pars ciliaris retinae* remain attached to the zonula. It is at once obvious that the vitreous of a bird's eye possesses a considerable resistance in all its parts, and has the exact shape of the whole telescopic eye. It consists of a posterior flat portion rather like a section of a sphere, and an anterior narrow and proportionately very long attachment which contains the lens at the fore end. This outgrowth is entirely surrounded by the zonula, which is well developed in birds. It has the shape of a hyperbola of rotation and is strongly concave on its outer aspect. Whoever has once dissected it cannot fail to recognise that the vitreous is an organ with a highly differentiated structure and that it must have a value in accommodation when its close connection with the lens is considered, which is let into the solid telescopic process of the vitreous just as the pecten is imbedded at the opposite end. But even the examination of the vitreous of mammals establishes the fact that it is an organ with a highly developed structure. By the simplest methods a system of lymph spaces can be demonstrated in it, a fact which shows that the vitreous is not a homogeneous gelatinous mass. but really a highly differentiated organ.

The next most important fact in this connection is that in the well developed eyes of mammals a canal pierces the vitreous, which beginning at the optic nerve in a funnel shaped opening, stretches as far as the posterior surface of the lens, being at any rate only separated from it by a thin layer of vitreous substance. In embryonic life the hyaloid artery takes its place, and when it disappears, the canal develops. It is in consequence still narrow in young animals, and its diameter increases as the eye grows. Its width varies greatly in different animals. In the deer it is large, measuring 5 mm. in the middle, and 10 mm. at its funnel-shaped extremity. The canal is proportionately wide in the pig, the measurements being 2 mm. and 4 mm. at least. In other animals it is proportionately or absolutely narrow, as in sheep and cattle.

The presence of this canal shows at once that the vitreous is an organ with a differentiated structure. It is present only in mammalian eyes. In birds and reptiles it is represented by the pecten In fishes we find the *processus falciformis.* The substance of the vitreous shows marked variations in consistence. In fishes it is watery, like a solution of glue. As the eye develops, the density of vitreous increases. In man the peripheral parts are almost as viscid as the youthful lens substance. The differentiation of structure becomes more marked as the species is higher. In mammals we can distinguish a cortex of concentric strata or of lamellæ lying one on the other, the first in pigs, cattle, and sheep, the second in the horse, and a solid core. It is characteristic that this difference does not obtain in young animals. This is especially clear and astonishing in cattle. In fully grown animals the cortex is separated from the core by a conchoid lymph space which stretches from the papilla to the ora serrata ; even inside the cortex itself there is a conchoid lymph space of equal size. The vitreous of the calf shews no signs of such differentiation and forms a homogeneous sphere pierced by the narrow central canal.

The vitreous of the human eye presents great and characteristic differences as compared with mammalian eyes. In man the hyaloid artery disappears early, and cannot be seen in an eight months' fœtus, being replaced by the central canal which is at this stage very narrow and hard to find. In the new-born child it is well developed, and has, when completely filled, a diameter of about 2 mm. The vitreous at this stage is homogeneous and undifferentiated. The vitreous of the fully grown eye has a structure which is quite different in structure from that of the other mammalian! eyes (the higher apes excepted) : whereas the usual mammalian vitreous consists of a semi-fluid cortex and a more solid core, in man the conditions are reversed. The human vitreous possess a viscid cortex and a semi-fluid nuclear substance. If we carefully dissect out the transparent nucleus of the eye we notice in most cases at once, but always if we gently move the vitreous backwards and forwards in the dissection dish with a fine brush, that some of the substance flows out on the side which faces the optic nerve, spreading out into a hemisphere. If we let some Berlin-blue flow over it, an opening about the size of the central diameter stains sharply between the border of the soft substance which wells out and the peripheral resisting matter. If we gently move the mass, so that the central projecting plug projects and retires, and at the same time add a little water, the stain flows from the peripheral substance but is taken up by the central matter and easily passes forwards as far as the lens capsule. Thus, the centre of the vitreous is more distinctly differentiated from the periphery, which remains unstained. At length the central substance forms a dark sphere enfolded by the cortex which remains as bright as glass. If we stain very gradually or express the contained fluid, it becomes clear that there is a system of lymph spaces within the soft nuclear substance which permeate it from lens to papilla.

The central substance is formed of a delicate folded semi-fluid sponge-like tissue consisting of thin layers of vitreous substance which when stained, look like membranes and are attached to the posterior lens capsule with the mere intervention of a layer of vitreous substance. For if one carefully removes it from the posterior capsule stains do not enter the central substance. If, however, one removes this thin layer with iris scissors the staining solution at once penetrates, colouring the central folded substance. If one imagines a cloth invaginated so as to form a series of recesses, we have a schema of the structure of the vitreous. Instead of a closed canal, as in most mammals, we find in man a wide lymph space inside a solid peripheral ring, which is filled with a soft folded substance. There is present, if one so regards it, a central canal with side chambers closed by membranous walls.

The zonula is an integral part of the vitreous. It arises with all its fibres from it, and is inseparably attached to it. The zonula is most beautifully differentiated in birds of prey. Here it is much larger and more developed than in the human eye. It encloses the whole telescopic attachment and the superficial part of the posterior half of the vitreous where it blends with the hyaloid membrane.

There is no anatomical connection between the ciliary body and the zonula, only a physiological, for the two closely cohere. As far as I can see, this cohesion is greater in badly accommodating mammals than in birds and in men. In these latter it looks as though the centre transparent nucleus had free play. When the vitreous, lens, and zonula have been isolated, the whole can be stained and examined under sufficient microscopic enlargement. It is easy to see the course of the bundles of fibrillæ to both sides, both towards the lens capsule and the ora serrata. All the glass-bright but sharply contoured fibres belong to the vitreous, and it cannot be discovered (as T. P. A. Stuart has stated) that part of them have been torn off from the ciliary body. The zonula is firmly attached to the vitreous right up to the anterior free portion. This free portion is concave at its forward end. This concavity was first discovered by Schoen, whose views wrongly met with much disbelief. If the vitreous of birds of prey be examined, it will be found to possess the shape of the entire telescopic eye, and in consequence the whole zonula is concave outwards and forwards. The zonula joins the lens by a delicate dentation. But the description of a *ligamentum suspensorium lentis*, however suitable for fishes, is quite inadequate for the eyes of the higher vertebrata and man. The lens is not attached to the zonula, but, if one may say so, the zonula to the lens. If one divides the zonula the lens in no way falls away, but remains attached to the vitreous. Even in the human eye which has remained for weeks in water to which a few drops of formol have been added, the lens remains attached to the vitreous even when the zonula has been divided all round. The lens of the bird's eye is specially firmly imbedded in the telescopic attachment in solid vitreous substance. It is scarcely possible for one who has occupied himself with such dissections to imagine that the lens could shake or fall. Vitreous, lens, and zonula belong to each other like a ring in which a diamond is set.

Comparative anatomy shows that the more prominent the formation of the ring and the wider the central canal the greater the power of accommodation.

3.—The Ciliary Muscle and its Action.

When we consider the relationship of the lens to the vitreous as similar to that of a diamond in its setting then it follows that the changes in form of the lens must be dependent upon changes in shape of the vitreous. When the ring narrows, the convexity of the lens must increase ; when it increases, the convexity must diminish. The outer coats of the kernel of the eye, the choroid and ciliary body, have no strict anatomical connection with the kernel, but the two as regards the problem of accommodation cannot be physiologically separated. The outer ring, composed of ciliary body and choroid, by alternately expanding and contracting, causes similar changes in the inner ring. These changes can only be brought about by the ciliary muscle, whose relationship we must now examine. In the human eye we can distinguish three kinds of fibres—the circular fibres, the outer and the inner meridional fibres. They can be represented fairly accurately by a schema composed of rubber bands. The circular sphincter fibres can only act by drawing the folds of the zonular frill nearer together, and making the vitreous ring smaller at its anterior portion, assuming, of course, that it is capable of narrowing. The more developed the power of accommodation, the greater the development of the circular muscle. It is more powerful in man than in the apes. In hypermetropes it is well developed, whereas in myopes of high degree, who never use any accommodation, it is entirely wanting. In birds, who have wonderful accommodation, there are no sphincter fibres, but two parts of the *tensor choroideæ* act as sphincters : Müller's portion especially acts a powerful circular muscle.

At first sight the action of the meridional fibres does not seem so clear. If we insist that the zonula is an integral portion of the vitreous which must in this respect not be considered as an isolated structure, and that it is not a question of its tightening or slackening but of the widening or narrowing of the vitreous ring, then it becomes clear from a consideration of the path of the muscle fibres that the internal meridional fibres must have a different function to the outer. Schoen has already ascribed different functions to them.

The external meridional fibres arise at the corneo-scleral margin and are attached to the surface of the suprachoroidea. If the choroid were a simple sheathing membrane of the retina and the vitreous, then the contraction of these fibres would draw the choroid bodily forward, with the vitreous and the retina, shortening the axial and lengthening the meridional diameter. It would then be conceivable, as Tscherning suggests, that the peripheral portions of the lens is compressed between the peripheral parts of the vitreous and the tense zonula. Tscherning has, however, left the fact that the choroid is attached to the optic nerve out of consideration. It cannot be drawn bodily forwards, but the tension of the ciliary muscle fibres can only narrow it anteriorly; posteriorly the pressure of the vitreous must distend it. The external muscles can therefore only exert a sphincter action; they narrow the vitreous ring just as does the sphincter, only the action is impressed upon a more posterior zone. Only those fibres can narrow the ring which are inserted into it at an angle of 45° or less. Those fibres which are inserted at a more obtuse angle into it dilate the ring.

The hypotheses of Helmholtz, on the one side, and of Tscherning and Schoen, on the other, are diametrically opposed as regards the action of the ciliary muscle. According to Helmholtz, the muscle loosens the zonula, whereas Tscherning thinks the ciliary muscle tightens the zonula, and Schoen imagines that it partly tightens it. Both hypotheses are correct, as far as the fact that the inner and outer fibres antagonise each other, and this is the simplest way by reason of the varied inclination of their course.

It is, however, necessary to abandon the idea of an isolated action upon the zonula. The suggestion of Helmholtz that the posterior end of the zonula approaches the anterior is false, because the zonula forms an integral part of the vitreous, and cannot slip forward on the inner surface of the ciliary body. Tscherning replaces the Helmholtz faulty anatomical representation by another, which is also incorrect, for he would have it that the zonula leaves the anterior inner border of the ciliary body. The zonula belongs entirely and exclusively to the vitreous, and can only alter its position with the vitreous; this signifies that as the vitreous ring narrows, its folds approximate each other, and *vice versâ*.

It follows from this, however, that we can only speak of a tension of the zonula caused by the fibres of the ciliary muscle in an equatorial direction, never in a meridional. The very word "tension" is inappropriate here, for it is only a question of the approximation and parting of the zonular folds. Whereas, then, it is impossible to regard this process as stretching and loosening in the strict sense of the words, it follows, that the contraction of the ciliary muscle fibres exert absolutely no action upon the tension of the zonula. A meridional tension of the zonula alone can haveany value in positive accommodation. The course of the ciliary muscle is, however, not of a nature which enables it to exert this force; such an erroneous idea could only have arisen because the fact that the choroid was firmly attached to the optic nerve had been overlooked. The ciliary muscle fibres can contract and expand the vitreous ring and so contract and expand the zonular frill, but cannot tighten or slacken the zonula in a meridional direction. Such an alteration in tension is only possible from a change in shape of the lens, that is purely mechanical and secondary.

4.—The Process of Accommodation.

As we have said, the lens and vitreous have the same relationship as a diamond to its setting. The chief point in this setting lies in the ring, that is in the vitreous, and not in the zonula, which only plays the part of the fine projections of the setting which hold the ring. This comparison is the more apposite in the case of the human eye, for the vitreous, by virtue of its peripheral resistent mass, really forms a ring, to whose inner margin the lens is attached.

The zonula therefore cannot be the chief agent in the mechanism of accommodation as the theories accepted up to the present demand. Its *rôle* is far more of a secondary character. The important factor in the process must be sought in the fact that the ring in which the lens is placed can be narrowed or contracted, for it is then manifest that the lens must alter its shape.

There can scarcely be any question of the expansion of the ring beyond its position of anatomical equilibrium. The cadaveric eye is, as can easily be demonstrated in the freshly dissected eye, in a position of adjustment for far vision ; the background is seen erect. Any expansion of the vitreous ring and with it a stretching of the zonula, that is a separation of its folds, would give rise to a negative accommodation in the sense of the old physiologists ; there is, however, no such thing. In man such a negative accommodation would postulate a flattening of the lens surface, which would circumscribe the natural refraction, a useless process, the existence of which can be excluded with absolute certainty, and which could only with difficulty be explained by anatomical conditions. A dilatation of the ring by muscular action can only take place when it has been previously narrowed.

The mechanism of accommodation, only considering the alteration in curvature, is a very simple matter The vitreous is compressed by muscular action, the ring is narrowed and the compressible lens mass is squeezed together equatorially and in consequence must bulge forwards and backwards. The purely mechanical tension of the zonula regulates this process, so that this arching is not too great or irregular.

Compression of the vitreous cannot occur without transfer of fluid within its structure. And further, there must be no rise of intra-ocular pressure during accommodation, for otherwise the visual acuity could rapidly fall, owing to defective circulation.

The central vitreous canal provides an arrangement whereby there can be fluid transfer without rise of pressure. Both Tscherning and Anderson Stuart have ascribed this function to the central canal. Stuart's paper has been greatly neglected, but is none the less worthy of careful study.

In birds, which have such wonderful accommodation, the pecten fulfils the functions of the central canal.

As the vitreous ring narrows anteriorly, it must be distended posteriorly. The fore part of the central canal becomes narrowed, the posterior dilated. The further question must be answered, how can room be made for this distension without rise of intra-ocular pressure?

The answer is found in the arrangements of the lymphatic spaces in the larger membranes. There are two chief ones, the first between sclera and choroid, the second between choroid and retina, or, to be more exact, between the pigment epithelium and the retina. The outer is of considerable size in birds and even in man.

When during accommodation the vitreous ring narrows, the choroid is pressed against the retina in the anterior part of the eye, the fluid between the two is forced backward, and the lymph opening (*spalt*) of the secondary optic vesicle (*Augenblase*) is widened. Then the choroid is squeezed against the sclera and the lymph space between the two is narrowed. But as this must be dilated anteriorly by the narrowing of the accommodation ring, the fluid which has been pressed backwards has room to stream forwards. The reverse happens when accommodation relaxes, so that no general rise of intra-ocular tension occurs.

The condition of muscular tone must receive brief mention. In the normal eye the fibres which have sphincter action are far more numerous than those with an opposite action, that is to say, the circular fibres and the external meridional fibres. It is therefore correct to assume that sphincter tonus must be present. It follows that the resting eye is adjusted for accommodation even for infinity. For there is no emmetropia; the normal eye is always slightly hypermetropic, not only in man, but in the higher vertebrates.

The explanation of presbyopia presents no difficulties. If the lens substance loses its youthful softness, it can neither be pressed together nor squeezed.

Finally, we can explain the remarkable fact that in high myopia the ciliary muscle as a whole is hypertrophied, but the circular fibres are absent. High grade myopic eyes require to exert little accommodation for which the external meridional fibres amply suffice. The internal meridional fibres are well developed in such eyes, for they are able to relax accommodation in distant vision.

T. HARRISON BUTLER.

REPORT OF THE DEPARTMENTAL COMMITTEE ON SIGHT TESTS.*

On June 22nd, 1910, a Committee was appointed by the Board of Trade to inquire "what degree of colour blindness or defective form vision in persons holding responsible positions at sea causes them to be incompetent to discharge their duties, and to advise whether any, and, if so, what alterations are desirable in the Board of Trade sight tests at present in force for persons serving or intending to serve in the merchant service or in fishing vessels, or the way in which these tests are applied." The following formed the Committee:—The Right Hon. Arthur H. Dyke Acland, Chairman; Mr. Raymond Beck; Captain Thomas Golding; Professor Francis Gotch, F.R.S.; Mr. Norman Hill; Mr. Edward Nettleship, F.R.C.S.; Mr. J. H. Parsons, F.R.C.S.; the Lord Rayleigh. O.M., F.R.S.; Professor Starling, M.D., F.R.S. *Secretaries*: Dr. William Watson, F.R.S., and Mr. S. G. Tallents.

On January 26th, 1911, Professor C. S. Sherrington was appointed to fill Professor Starling's place.

The Report of this Committee has recently been issued. It is divided into five parts. Part I. deals with existing regulations, practice, and results obtained; Part II. recounts experiments conducted in the open air; Part III. considers the degree of defect involving incompetency; Part IV. advises certain alterations; and Part V. gives an account of various experiments conducted for the Committee.

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*Report of the Departmental Committee on Sight Tests. Eyre & Spottiswoode, Ltd., East Harding Street, London, E.C. 1912. Price, 4½d.

The Committee summarise their recommendations as follows :—

(1) When an inquiry is held regarding a shipping casualty, witnesses who give evidence with reference to coloured lights should always be tested for form and colour vision.

(2) The approximate limits of colour defect compatible with efficiency should provisionally be considered to lie between some such values of the luminosity ratio as 1·5 and 0·85.

(3) The wool test should be modified—(a) By substituting a dark brown skein for the third (deep red) test skein at present in use ; (b) By dividing the skeins into specified groups, one group for each test skein, and requiring the candidate to divide each group in two parts, those which resemble in colour the test skein and those which do not.

(4) That the lantern suggested by the Committee be used as well as the wool test.

(5) It is unnecessary to re-examine for colour vision a person who has satisfactorily passed both the lantern and wool test.

(6) That the 1911 standard of form vision be adhered to. (5/5 partly in one eye, 5/10 in the second eye.)

(7) That any officer whose vision in the better eye is less than 5/10 be considered to be incompetent.

(8) Parents and authorities of training ships should be advised that the eyesight of boys adopting the sea as a profession should be examined by an expert (to exclude hyperopia and defects).

(9) That the local tests be left in the hands of the present type of examiners.

(10) That these men should receive a careful course of instruction.

(11) That a distinction be drawn between "appeal" and "referred" cases of failure to pass the local tests.

(12) That an ophthalmic surgeon be added to the present Board of Examiners in appeal cases.

The report was signed by the whole committee, but Mr. Norman Hill added a reservation. He was opposed to the more difficult form tests and considered that the old test which only demanded an acuity of 5/10 partly (5 out of the eight letters in the fifth line), and in which both eyes were examined together was amply sufficient ! He would, however, have each eye tested separately to exclude gross defects.

We shall now consider certain aspects of the Report which, in our opinion, lie open to somewhat serious criticism.

On page 5 it is stated that *the Board of Trade was not aware of any casualty which could be traced to defective vision.* This is an astonishing confession of ignorance ! In the first place, the Board of Trade has not held any examinations of the vision of those responsible for accidents, and so they are hardly likely to discover any evidence that the accident was due to defective vision. The Committee, in spite of their view that defective eyesight has never caused an accident, recommend that witnesses should be examined for form and colour vision when they have to give evidence regarding coloured lights. But even if the Committee could obtain no evidence of this nature, it is surely a matter of common knowledge that defective vision has led to many accidents. The most recent and glaring case is the wreck of the "Australia," at Port Phillip (Melbourne), which was proved by the Australian Authorities to have been caused by the fact that the pilot only had 6/36 vision in each eye ! In a paper published in the *Zeitschrift für Augenheilkunde* of July, 1912, Professor Stargardt and Fleet-Surgeon Oloff, who have had great experience in sight testing for the German Navy and State Railway, give a long list of accidents by land and sea, due to colour blindness and defective sight. "The City of Austria" was lost in Fernandia Harbour because the pilot could not distinguish the coloured lights on the gas buoys. The collision between the "Isaac Bell" and the "Lumberman" was caused by one of the captains mistaking the red side light for green, and altering his course accordingly. There would be no difficulty in multiplying cases, but no good purpose would be served by doing so. It is a well-known fact that accidents both by land and sea have been caused by defective sight But the Board of Trade is evidently ignorant of them. On page 6 of the Report, however, the confession is made that collisions and strandings *due to bad look-out* on British vessels amount to "less than 500 a year." Truly, an appalling figure.

The Committee have had great difficulty in deciding the degree of colour blindness which renders a candidate incompetent to be an efficient officer. It would appear to be a simple problem. If a candidate, when tested with an efficient lantern, which is furnished with neutral tinted glasses, ever calls white lights "red" or "green," or confuses red and green, he is too colour blind to be allowed to take charge of a ship on the sea or of an engine on the railway. Other defects, such as confusing green and blue or red and orange and yellow, are unimportant. But the Committee rejecting this simple lantern test, suggest certain others (flicker and luminosity tests) introduced by Sir William Abney, methods which have so far not received universal acceptance and which are far more complicated than the lantern examination.

Holmgren's wools are to be retained, but they are to be simplified. The Committee considered certain defects in the test, but they make no mention of the one vital objection to it, namely, that *a large number of dangerously colour-blind folk can pass it easily*. This has been pointed out by F. W. Edridge-Green and many others in this country, and in Germany the test has been definitely abandoned for this reason. Köllner (*Die Störungen des Farbensinnes, etc.*, Berlin, 1912, S. Karger) condemns it severely and does not even recommend it as a subsidiary method. He mentions that Nagel examined a large number of men who had passed the Holmgren examination and found that 5 per cent. of them were colour blind—in other words, more cases had escaped detection than had been detected! Stargardt and Oloff (*loc. cit.*) say, "*Ganz zu verwerfen sind die Holmgrensche Wollprobe.*" Could words be stronger? Literally translated, "Holmgren's wool test should be thrown away entirely." They give instances and statistics which fully confirm all that Nagel, Edridge-Green, and others have said upon the subject. And yet the test which has been condemned by scientists as utterly unsound is not only to be retained but actually to be simplified.

The Committee, however, must have had doubts about this method because they have suggested a lantern of their own. We have not seen it, but judging from the description, it must be a very bad one, because it has three colours only (red, green, and white) and no neutral glasses. The reason for not having any is delightfully *näive*: the examiners are so inexpert that such a lantern would be too complicated for them. And yet these retired sea captains are to be retained as examiners! The suggested lantern could not detect a man who had shortening of the red end of his spectrum and he would pass the wools easily. Hence, the most dangerous person of all, a man who sees no light at all when a red light is obvious to the normal eye, passes with ease.

It should be remarked that the candidate is to be shown the white light and told that it is not red "because he may easily call a paraffin lamp seen through white glass red." The lantern is said to have four "white glasses." How do "white" glasses vary?

Nagel's test is dismissed in a few words; and Stilling's, which Stargardt states to be the only trustworthy pigment test, is not even mentioned.

We consider the Report, then, to be singularly defective: first, because it fails to recognise that accidents caused by defective vision have happened and do happen; secondly, because it neglects the fact that quite a sensible proportion of officers at sea are colour-blind and have defective form vision; thirdly, because it retains the Holmgren test, which has been shown to be utterly inefficient, and which allows a large percentage of colour-blind persons to pass; fourthly, because it suggests a lantern which has no neutral modifying glasses; and, finally, because it retains examiners who are admittedly too inexpert to use anything like a proper instrument.

As some sort of set-off, certain of the recommendations of the Committee are excellent. They suggest that the reponsible persons should be examined for visual defects, after accidents at sea. They have introduced a lantern, a bad one it is true, but then any lantern is better than none at all. They have advised that the higher standard of form vision be adhered to.

We fully realise that the supply of officers for the Mercantile Marine is not in excess of the demand for them, but the travelling public must and shall be protected. If shipowners will pay junior officers a living wage, they will have no difficulty in getting men with normal sight, but they cannot expect the highest standard for £8 a month. The Australian regulations are much more severe than the British ones, and yet there is no difficulty in getting men, but, then, they are paid well!

We hold that the form test represents the minimum that is necessary, and that the sight tests should be repeated every five years.

THE OPHTHALMIC CLINIQUE OF THE UNIVERSITY OF BORDEAUX.

BY

BERNARD CRIDLAND, D.O.Oxon., F.R.C.S.E.
WOLVERHAMPTON, ENGLAND.

THE ophthalmic clinique of the University of Bordeaux is located in the Hôpital St. André, a large building containing 750 beds, of which 42 are given to the service of ophthalmology.

Situated close to the cathedral in the centre of the city, the Hospital is within easy reach of the principal hotels. From an architectural point of view, it is undoubtedly a fine structure, but by reason of its age, its internal arrangements fall perhaps somewhat short of modern hospital requirements.

The ophthalmic block lies immediately to the right of the main entrance, and occupies the first and second floors. It consists of an out-patient and an in-patient department, with a pathological room.

The out-patient department is on the second floor and is arranged to give the maximum of efficiency and convenience with the space at disposal. A long corridor serves as a waiting-room and gives access to the consulting-room, in which patients are first seen and sorted.

Leading from this room is the dark room, and beyond this and communicating with the corridor, is the refraction-room, in which perimetric and other examinations are carried out.

Next to the refraction-room comes the operating theatre with a small room leading from it containing special instruments such as the magnetometer, and others which may be required immediately before operation. Taking the various rooms in detail, the consultation room is a convenient apartment, 5 metres square. Here ordinary cases requiring simple treatment are dealt with and the more complicated ones sorted out. It is used also as an out-patient operating theatre for simple operations, cauterisations, and septic cases requiring surgical treatment. It is well fitted with sterilising apparatus, wash basins, tanks of sterilised water, a rheostat, and operating table. The last-named can be wheeled on rails into the room from a recess in the wall, a handy arrangement.

In the dark room which leads from the consultation room there is accommodation for the examination of eight patients. The indirect method is chiefly used, and the lamps, which are of the chimney type, stand on a wooden shelf behind the patient and are moved to either side as desired. The walls are mapped out for the estimation of diplopia, and elsewhere contain numerous pictures illustrating fundus conditions for teaching purposes.

In the refraction room tests are carried out at 5 metres in daylight. Perimetric examinations, which are made here, are chiefly carried out with a perimeter fitted with Fuch's electric light arrangement, which gives a square of white, red, green, or blue light which can be varied in size from 1 mm. upwards. It is noteworthy that all glaucoma fields are taken by this method. There are, of course, suitable means for darkening the room.

During the visit a number of exceedingly interesting cases were seen in the department, including a large number of glaucoma cases which had been operated on by Professor Lagrange by his method and which illustrated fully the value of the operation.

The operating theatre, situated at the end of the waiting-corridor, is a large room with ample accommodation for spectators railed off from the arena of operation. It is well fitted with all modern appliances for dry sterilisation, and is well lighted with one large window, supplemented during operations with an electric projection hand-lamp. The patient after entering the theatre and before entering the arena, is enveloped at once in a long gown fitting tightly round the neck and reaching to the heels. In the preparation of the region of operation great care is observed, and the simple efficiency of the final douching with sterile saline solution was striking. An ordinary wine bottle is fitted with a rubber cork perforated with two tubes, one for the entry of air and the other for the exit of the solution. the latter of which is fitted with a sufficiently long rubber tube, ending in a glass nozzle of a pattern designed by Professor Lagrange. The end is flattened and bent on itself with perforations at the edge. An excellent flow of liquid into the fornices is obtained, and can be easily regulated by raising or lowering the inverted bottle.

All dressings, gowns, masks, caps, etc., are sterilised in the autoclave, each in separate boxes, and around each box when ready is wrapped a paper "*bande de sureté*," on which are printed instructions that it is not to be broken until the moment of using. Instruments are sterilised in the dry steriliser in separate nickel-plated cases for each operation in the manner usual in France.

The magnet in use is of the Volkmann type, as in so many French cliniques. Opportunity was afforded of witnessing, amongst a number of others, Professor Lagrange's own operation of sclerecto-iridectomy for glaucoma and a new operation for detachment of the retina to be published later by him.

The in-patient department consists of two male and two female wards. The former lie at the end of the waiting corridor on the second floor and beyond the operating theatre, the latter are on the first floor immediately beneath and are the counterpart of the former.

The first ward one enters on each floor is reserved for operation cases only, the second is for septic cases and for those requiring general treatment. The two are divided by a short corridor with a "sister's" room on one side and a small kitchen on the other.

The beds are about equally divided amongst the four comfortably furnished wards, the nursing of which is carried on by the Sisters of the Order of St. Vincent de Paul. The department is under the direction of Professor Lagrange, who is assisted by the Professor Agrégé Dr. Aubaret, Dr. Beauvieux, chef de clinique, Dr. Bonnefon, chef de clinique adjoint, and Dr. Delorme, assistant de clinique.

Two series of lectures are given yearly by the Professor and are entitled "The twenty-five questions in ophthalmology which every practitioner should know." The course is a very complete one and embraces the whole of the subject.

Demonstrations and practical teaching in ophthalmoscopy are given twice a week by the Professor and his assistants.

Operations can be witnessed thrice weekly. The whole system of instruction is particularly full and efficient and beyond the average. The medical school, situated near the Hospital, is a building well worth a visit, and the Colonial museum contains a large and interesting collection of anthropological specimens.

It is desired to make special mention of the great kindness and courtesy shown by Professor Lagrange and his assistants to the writer and his colleague, Dr. R. J. Coulter, on the occasion of their visit to Bordeaux.

CURRENT LITERATURE.

NOTE.—Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—ACCOMMODATION.

(1) **Best, F.**—Remarks on the central canal of the vitreous and upon Stilling's theory of accommodation. (Bemerkungen zum Zentralkanal des Glaskörpers und zu Stilling's Akkomodationstheorie.) *Zeitschrift für Augenheilkunde*, Juli, 1911.

(2) **Stilling, I.**—An answer to criticism of my hypothesis regarding the mechanism of accommodation. (Zur Kritik meiner Hypothese ueber den Akkomodationmechanismus.) *Zeitschrift für Augenheilkunde*, März, 1912.

(1) This paper, by **Best** of Dresden, is an answer to Stilling's article,* in which a new theory of accommodation was enunciated, a theory which gave the vitreous a considerable share in the mechanism of the act.

Best first asks the question, "Is there a central canal in the vitreous?" Stilling and his students see one in their dissections, and further demonstrate it by making it absorb coloured fluids. Best agrees that a canal can be demonstrated by Stilling's methods, and that it is not an artifact. In any case we must admit that there exists centrally in the vitreous a zone of diminished resistance.

Schwalbe demonstrated the same thing by injecting the canal with a Pravaz syringe. Leber also succeeded in filling the canal with fluid which he injected into the posterior chamber of a rabbit. Such a canal does not exist in birds and other classes of vertebrata. It is quite unnecessary that it should be demonstrable by histological methods: we can compare the vitreous to a sponge whose peripheral portions are very compact and solid, whereas the central portion is loose and easily permeable by water. In such a sponge water could easily flow in an axial stream, and yet no absolute tube would be present; such is the vitreous. Wolfrum is quite correct when he states that no central canal can be demonstrated histologically. We must, however, accept a physical canal.

Best now tries to find the physical causes which have led to the formation of this area of increased permeability. The forces which act upon the vitreous have their final origin from three physical acts: the normal interchange of fluid in the eye; the movements of the eye; the act of accommodation. As there is no actual "stream" of fluid in the vitreous, the fluid movement is so slow and so small that it is impossible to imagine that the central canal can have originated from hydrostatic or hydrodynamic causes. Best next discusses the movements of the eye and suggests a very fanciful theory which ascribes the structure of the vitreous to centrifugal force generated by the rolling movements of the eye. This force accounts for the radial course of the fibrillæ, for the more compact structure found at the periphery, and for the central canal. This theory appears to us, as we have said, to be "fanciful;" we might employ an almost stronger epithet.

The author then proceeds to adduce reasons why the act of accommodation can have played no part in moulding the structure of the vitreous. Any pressure exerted by the ciliary muscle must in such a loose fluid-like structure act equally in all directions, and could not be localised towards the centre, and so aid in forming a canal. The fact that birds, which have excellent accommodation, possess no canal is additional evidence in the same direction. Best admits that developmental conditions, such as the pressure of the hyaloid artery, have much to do with the presence of the canal of Cloquet. We should have thought that here lay the obvious *raison d'être* for such a structure, and that it was unnecessary to evoke centrifugal force. The centrifugal force generated by the act of rolling the eye would be insufficient to move the finest gossamer, and it is quite impossible to conceive that it could mould the vitreous. We might even ask "Does an embryo roll its eyes?"

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* Translated in the present issue of THE OPHTHALMOSCOPE.

The author devotes a few sentences to the demolition of Stilling's theory of accommodation. The lens is composed of more consistent material than the vitreous, and can therefore not be deformed by the pressure of a softer agent. But he has already told us that the vitreous acts like a fluid, that force impressed upon it acts equally in all directions; if, therefore, the vitreous be surrounded by rigid walls, any force impressed upon it must act along lines of least resistance. In this case the least resistance would be found anteriorly, and therefore the force can presumably deform the lens.

We are bound to conclude that Best's objections to Stilling's paper, when critically examined, have little weight.

The paper ends with the following sentences: "The structure of the vitreous is determined by the movements of the eye and not by accommodation." Whereas the eye of the embryo neither accommodates nor moves; it is quite obvious that its structure is influenced neither by the act of accommodation nor by the action of the extrinsic muscles.

T. HARRISON BUTLER.

(2) The chief objection which has been raised against **Stilling's** theory of accommodation is that the vitreous ring cannot exert any action upon the lens because the lens substance is less labile than the vitreous. The Strassburg professor answers that this is not correct; careful anatomical research shows that the vitreous in animals and birds has considerable consistency, and the same is true of the peripheral parts of the human vitreous. The consistency is greater than that of the peripheral portions of the youthful lens, the part most concerned in accommodation. Experiments with metallic quicksilver show that the vitreous possesses considerable elasticity, whereas the lens fibres have none whatever. Direct experiment shows that removal of the vitreous ring actually does increase the convexity of the lens It is best to dissect the vitreous of a bird of prey, such as *Astur Palumbarius*, with the lens attached. It is easy to see with a dissecting lens, or even with the naked eye. that slight pressure upon the base of the telescopic attachment, far away from the lens, increases the curvature of the lens. Whatever this experiment shows it is certain that it proves that the physical consistency of the vitreous is such that an action upon the lens curvature is not impossible. Those who study accommodation must make themselves acquainted with the anatomy of the vitreous. This structure is not, as Salzmann imagines, a tissue, but an organ of equal value with the lens, and a highly differentiated one. As Tscherning says: "*le crystalin, le vitré et la zonule forment donc un seul bloc, dont l'ensemble représente l'appareil accommodateur de l'œil.*"

T. HARRISON BUTLER.

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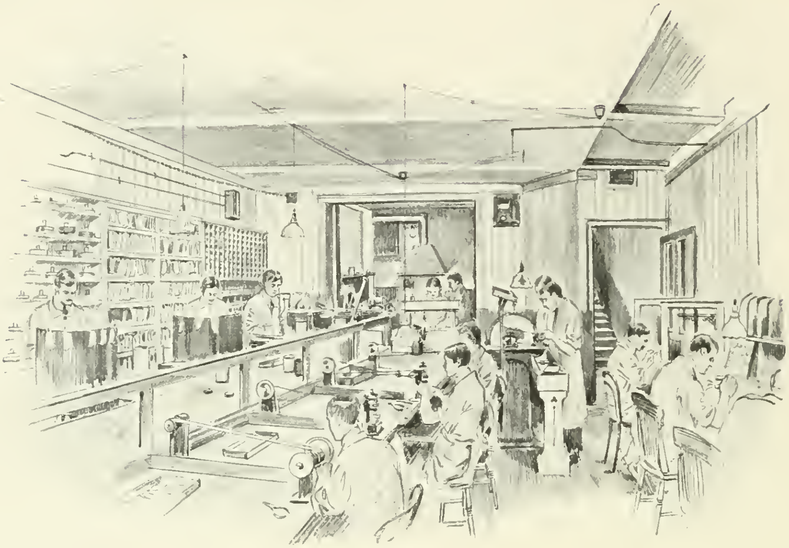

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II.—LIPÆMIA RETINALIS.

Köllner.—Lipæmia retinalis. (**Lipæmia retinalis.**) *Zeitschrift für Augenheilkunde*, Mai, 1912.

Köllner, of Berlin, describes a case of this condition of the blood and retina, a condition so rare that few ophthalmologists have ever had the opportunity of observing it. The kernel of the contribution is the coloured plate of the fundus which pictures the retina as seen when the lipæmia, or liphæmia, as Köllner says it should be called, was at its maximum. This drawing gives one a clear idea of what the retina is like, and anyone who has seen it should readily recognise the ophthalmoscopic appearances found in these cases.

As is invariably the case, the patient was a young diabetic affected with the disease in a severe form. His age was twenty-five, and seven years before Köllner saw him, he contracted pleurisy, apical phthisis, and eventually glycosuria. He passed twelve litres of urine daily which contained from 2 to 5.8 per cent. of sugar. There was no complaint about the eyes, which appeared outwardly normal and possessed full visual acuity. The field was not contracted. Both fundi showed, however, a characteristic picture. The otherwise normal papilla was of a chocolate colour, matching the rest of the fundus in colour. The choroidal vessels were slightly visible but normal in colour. The retinal vessels, on the contrary, were flesh coloured (reddish-white), but no lateral white sheath (periarteritis) was present. The reflex line was only slightly developed. As the vessels approached the periphery, they became pure white. No œdema, hæmorrhages, or white *plaques* were seen. All the retinal vessels appeared of larger calibre than normal, but no tortuosity was present. It was quite impossible to distinguish arteries from veins. An examination of the blood revealed the fact that it contained 26·25 per cent. of fatty matter which could be extracted with ether; and 2·16 per cent. of cholesterine. Nine weeks later, the condition of the retina was nearer the normal and the fat content of the blood had sunk to 15·5 per cent. Soon after, the patient died. Microscopic examination of the retina and choroid revealed nothing abnormal.

Cases of lipæmia retinalis have been described by Heyl, Reis, White, Fraser, Heine, and Hertel. In every case the patient was a young diabetic, in whom the typical fundus picture appeared shortly before death. The appearance is so pathognomonic that it warrants the immediate diagnosis of lipæmia and diabetes, and it may be regarded as a terminal symptom. Köllner, however, insists upon its great rarity. Dreschfeld has never seen a case; Heine and Uhthoff only two between them; and Köllner only one, although he has been examining cases at the large Moabit General Hospital for years.

The last two pages of the paper are occupied by speculations regarding the cause of the appearance. Why do the choroidal vessels appear normal, whereas the retinal are white? Köllner has not succeeded in invoking the picture experimentally, either by experiments with capillary tubes, or by injecting rabbits with oil and fat. The rabbits all died, and refused absolutely to do their duty in this respect. T. HARRISON BUTLER.

III.—THE SURGICAL TREATMENT OF STAPHYLOMA.

(1) **Neschitsch, G.**—A contribution to the treatment of ectatic cicatrices of the cornea: trephining staphylomata. (Beitrag zur Heilung der ektatischen Hornhautnarben. Trepanation des Staphyloms.) *Zeitschrift für Augenheilkunde*, Juni, 1911.

(2) **Sameh Bey.**—New operations for Staphylotomy. (Nouveaux procédés de staphylotomie.) *La Clinique Ophtalmologique*, 10 décembre, 1911.

(3) **Komoto.**—A simple operation for removal of large corneal staphylomata. (Ein einfaches Operations-Verfahren zur Abtragung des grossen Hornhaut-Staphylom.) *Centralbl. f. prak. Augenh.*, Januar, 1912.

(1) **Neschitsch**, of Belgrade, first discusses the various methods which have been adopted in the treatment of staphylomata, especially the use of the actual cautery. He then gives the results of his experiments upon rabbits and dogs. It is, he says, exceedingly difficult to produce a staphyloma in an animal. He only succeeded 13 times in 118 eyes experimented upon, using the actual cautery. Chemical caustics had no effect in this direction, and infection with pyogenic organisms was little better. A study of his experiments leads him to form the opinion that the only really satisfactory way to treat a staphyloma is to make an ample trephine hole in its apex. The experiments upon artificial staphylomata being satisfactory, he proceeded to operate upon the human eye, and with the best results. He uses an electrically-driven trephine which has a continuous movement of rotation, unlike v. Hippel's trephine, which oscillates to and fro, and so loses efficiency.

T. HARRISON BUTLER.

(2) **Sameh Bey**, of Cairo, practises several operative procedures for corneal staphyloma, according to the extent of the last-named and the condition of the iris. Tearing out of the iris appears to form the basis of most of the operations he describes. In total conical or spherical staphyloma, he combines that procedure with removal of the crystalline lens. SYDNEY STEPHENSON.

(3) **Komoto**, of Tokio, has devised a very useful method of removal of large corneal staphylomata.—First, the staphyloma is transfixed at its base from one side to the other with a Graefe knife, and the wounds are slightly enlarged, and the knife is withdrawn. The staphyloma is then seized with two pairs of forceps, and with straight scissors is cut into two portions right down to the original incision made with the Graefe knife, and the bottom of this cut is immediately drawn together by a stitch. Then each half of the staphyloma is cut off and stitched, so that three sutures hold the opening together. It is unnecessary to cover the opening with a conjunctival flap, a procedure which complicates the operation and has no countervailing advantages.

A. LEVY.

IV.—OPHTHALMOLOGY AND GENERAL MEDICINE.

(FIFTH NOTICE.)

(1) **Thompson, Edgar S.**—Report of two cases of retinal phlebitis following influenza. *Annals of Ophthalmology*, Vol. XIX, p 248.

(2) **Oliveres, A.**—On some ocular signs of arthritism. (Sur quelques manifestations oculaires de l'arthritisme.) *La Clinique Ophtalmologique*, 10 juillet, 1910.

(3) Mathewson, Geo. H.—Four unusual cases of albuminuric retinitis. *Montreal Medical Journal*, December, 1910.

(4) Risley, S. D.—The ocular affections in congenital syphilis. *Ophthalmic Record*, April, 1911.

(5) Taylor, James.—A case of myasthenia gravis. *Ophth. Review*, June, 1911.

(6) Burrows, Harold.—Blue sclerotics and brittle bones. *British Medical Journal*, July 1st, 1911.

(7) Hudson, A. C.—Leukæmic affections of the eye, with an account of a peculiar case. *Royal London Ophthalmic Hospital Reports*, Vol. XVIII, Part II, September, 1911.

(8) Knapp, Philip Coombs.—The early symptoms of general paralysis. *Journ. of Nervous and Mental Disease*, September, 1911.

(8A) Schur, M.—On the cervical sympathetic with reference to the progress of its paralysis with especial reference to the eye symptoms. (Ueber der Halssympathaticus nämlich der Verlauf seiner Lähmung mit besonderer Berücksichtigung der Augensymptome.) *Zeitschrift für Augenheilkunde*, September, 1911.

(9) Gravier, L.—Right hemianopia and left-sided blindness due to cerebral tuberculosis. (Hémi-cécité droite et cécite gauche par tuberculose cérébrale.) *Revue Générale d'Ophtalmologie*, 31 octobre, 1911.

(10) Shahan, Wm. E.—Copiopia hysterica; with report of two cases. *Journal of Ophthalmology and Oto-Laryngology*, November, 1911.

(11) Holden, W. A.—A report of four cases of acute disseminated myelitis with retrobulbar degeneration of the optic nerves. *Archives of Ophthalmology*, November, 1911.

(12) Hennicke, Carl R.—The eye affections in myxœdema. (Augenerkrankungen bei Myxœdem.) *Klin. Monatsbl. f. Augenheilk.*, November, 1911.

(13) Davies, D. Leighton.—Some affections of the optic nerve in relation to medicine and surgery. *Clinical Journal*, November 29th, 1911.

(14) Grüter, Wm.—Peculiar defects in the ocular muscles in a case of atypical progressive muscular atrophy. (Eigenartige Augenmuskelstorüngen bei einem atypischen Fall von progressiver Muskelatrophie.) *Zeitschrift f. Augenheilkunde*, Dezember, 1911.

(15) Adam.—On ocular changes in eclampsia. (Ueber Augenveränderungen bei der Eklampsie.) 37 *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1911.

(16) Greeves, R. Affleck.—A case of nuclear paralysis of the sixth nerve, following acute polio-encephalomyelitis. *Trans. Oph. Soc. U.K.*, Vol. XXXII, Fasc. I, p. 104, 1912.

(17) Kuhnt, H.—On symmetrical circumscribed scleral necrosis in hydroa vacciniforme. (Ueber symmetrische umschriebene Skleralnekrose bei Hydroa vacciniforme.) *Zeitschrift für Augenheilkunde*, Februar, 1912.

(18) Taylor, James.—A clinical lecture on ocular palsies. *Medical Press and Circular*, February 14th, 1912.

(19) **Taylor, James.—A clinical lecture on conditions associated with ocular nerve paralysis.** *Medical Press and Circular*, March 27th, 1912.

(20) **Alt, Adolf.—A case of optic nerve atrophy after severe hæmorrhage from the stomach.** *American Journal of Ophthalmology*, March, 1912.

(21) **Wiegmann, E.—A case of optic nerve affection after whooping cough. (Ein Fall von Sehnervenerkrankung nach Keuchhusten.)** *Klin. Monatsbl. f. Augenheilk.*, April, 1912.

(1) **Thompson's** two cases followed severe attacks of influenza of a variety likely to lead to phlebitis and thrombosis (high fever and marked depression).

CASE I.—A man, aged 48 years, was seen in May 1899, for the correction of his refractive error (a myope of 4 D.). With the correction his vision was 20/15 in each eye. The fundi were normal. In August, 1908, the patient had influenza, followed by pneumonia. At this time there was some "disease of the vein" in the left eye, which evidently cleared up, but in March 1909, after another attack of influenza, the vision was reduced to 20/70. In August, 1909, there was a large patch of retino-vascular change to the infero-temporal side of the optic disc and of about 6 to 8 disc diameters in size. The two venous trunks were enormously dilated and tortuous, and the arteries much reduced in size, though not obliterated. The retina was opaque and whitish in the affected area, and there were numerous small extravasations of blood through the area, as well as for some distance beyond it: The vision was 20/50. Although the examination generally was not completed (owing to the patient's death from pneumonia), there were no evidences of vascular change.

CASE II —A man, aged 39 years, found the vision of his right eye slightly blurred three weeks after an attack of influenza. He was examined by Thompson one year later. The ophthalmoscopic picture was similar to Case I, but not so severe, and was entirely lacking in hæmorrhages, (the vision was 20/40 but had been 20/70). A spot of haze extended from the lower part of the disc, downwards along the inferior branches of the vein for two disc diameters. The veins were much obliterated Two superior veins were also somewhat dilated, and the disc was distinctly redder than that of the opposite eye. The absence of hæmorrhages in this case was rather remarkable, but it is possible that during the year that had elapsed, some small hæmorrhages might have occurred and become absorbed without leaving any traces. There were no signs of general arterio-sclerosis. JOHN WHARTON.

(2) **Oliveres**, of Tortosa, Spain, believes that the arthritic diathesis is responsible for many ocular conditions. In the present communication he refers especially to myodesopia and ophthalmic migraine. Having given to the former the alternative name of "*mouches volantes physiologiques*" he proceeds, "These observations (namely, of arthritism in such subjects) are of the highest importance if it be remembered that the pathogenesis of *mouches volantes* is still obscure and that perhaps the hyper-acid state of the humours of the eye might explain the appearance or the exacerbation of this physiological phenomenon." ERNEST THOMSON.

(3) Of the cases reported by **Mathewson**, of Montreal, one occurred in a boy, six years of age, another in a woman following child birth, and the remaining two cases in brothers, aged respectively 19 and 17 years.

SYDNEY STEPHENSON.

(4) **Risley**, of Philadelphia, remarks on the similarity between the secondary

and tertiary manifestations of congenital and acquired syphilis, the rarity of prenatal iritis, the possibility of extensive uveal disease being undiscovered until school age, or only accidentally discovered through the investigation of an associated nystagmus.

During the first month of extrauterine life, symptoms of general infection appear in 54 per cent. of infected cases. Proliferating choroiditis and later pseudoglioma are more common than violent iritis. Syphilitic endarteritis affecting the vessels of the retina and choroid may be found associated with syphilitic meningitis, keratitis, etc. In the tertiary stage the symptoms are similar to those of the acquired disease, but with the addition of the sequelæ of a vicious dyscrasia, *e.g.*, arrested developments, glandular disease, impaired metabolism, nodes, gummata, interstitial keratitis, imbecility or impaired mentality from arrested development of the brain; meningitis, optic atrophy, and the tabetic phenomena of childhood or early life. The author insists that in syphilitic dyscrasia, not only the uveal tract, but the thyroid and other ductless glands may be affected, and this probability must be borne in mind in their treatment.

J. JAMESON EVANS.

(5) The patient was a female, aged 23 years, whose earliest symptom was weakness in the lower limbs. This was followed by inability to open the eyes, together with defect of all ocular movements. The muscular weakness became general, the reflexes and sphincters remaining normal, and death ensued in an attack of difficult breathing. Examination of the nervous system failed to show any macro- or microscopical change; the thymus was larger than usual in this condition. Although all treatment failed in this case, **Taylor**, of London, says that he has obtained a good result in one instance by administering thyroid.

A. H. PAYAN DAWNAY.

(6) That there is a connection between thin sclerotics and fragilitas ossium was first suggested by Eddowes, who mentioned (*Brit. Med. Journ.* 1900, Vol. 2, page 222) the case of a young woman who had markedly dark sclerotics, and who had suffered from several broken bones. Her father had similar eyes and had also sustained many fractures. In another case a child with very dark sclerotics had nine fractures within the space of two years. It has been shown (L. Buchanan, *Trans. Oph. Soc.*, 1903, Vol. 23, page 267) that the condition of blue sclerotics is due to deficiency of fibrous tissue in the sclerotic. Eddowes has offered the suggestion that there is a want of quality or quantity of the fibrous tissue of the various organs of the body, thus explaining the want of spring or toughness in the bones of these individuals.

Burrows, of Portsmouth, now produces a very interesting pedigree concerned with 29 individuals. Of these 29 individuals, 13 had blue sclerotics, and of these 9 suffered from brittle bones. The pedigree represents four generations. The author remarks that two interesting facts may be observed in it.—In the first place, there is no instance of the transmission of blue sclerotics except from a parent who actually shewed that condition. The children of those members of the family who had white sclerotics themselves had white sclerotics without exception. Secondly, not a single case of fracture was known to have occurred among those who had normal sclerotics, although the other individuals suffered with exceptional frequency from broken bones. With regard to two members only out of the 29 there are no details. Of the remaining 14, who had white sclerotics, there was not a single one who was known to have sustained a fracture. Of the nine cases who are said to have had brittle bones, seven have suffered from multiple fractures and there is a sufficiently definite history of the condition. In the remaining two there is a positive history of one fracture-injury each.

ERNEST THOMSON.

(7) This communication contains a careful account by **Hudson**, of London,

of a case of myelogenous leukæmia, the patient being a man who attended the Hospital for a tumour of the bulbar conjunctiva of eight weeks' duration, which was first noticed during an attack of "influenza." There was also a tumour in the skin of the right hypochondrium, and the cervical, axillary, and inguinal glands were enlarged; the spleen occupied half the abdominal cavity. Fresh skin tumours appeared during the next few weeks, but no intraocular changes were seen until two months after admission, when there were scattered linear hæmorrhages in both fundi. The patient died ten weeks after admission. Periodic blood examinations showed marked diminution in red cells and colour index, and in white cells, the majority at the end being made up of large mononuclear basiphile cells. A careful *post-portem* examination was made and sections of the various organs were examined. The conjunctival tumour consisted of thickened œdematous epithelium and subepithelial tissues densely infiltrated with cells somewhat resembling lymphocytes. The intraocular hæmorrhages occurred in the nerve fibre and ganglion cell layers, the larger ones rupturing the external limiting membrane. The optic nerve tissues were œdematous, and some nerve fibres degenerate.

The paper contains an analysis of the literature on this subject, and concludes with a bibliography of some length. A. H. PAYAN DAWNAY.

(8) **Knapp**, of Boston, Mass., has studied the symptoms of general paralysis in one hundred consecutive cases. The series included ninety males and ten females, and three of the cases were in young persons aged thirteen, fifteen, and nineteen years respectively. As regards special senses, Knapp found that the sense of sight was one whose disturbances were of most significance. Diplopia, due to some oculo-motor paralysis, and failure of vision, due to some affection of the optic nerve, were not uncommon manifestations. Diplopia was present in 21 per cent. of the patients at the time of examination, and failure of vision in 18 per cent. Three of the patients showed a moderate amount of neuritis. The older statements, that atrophy is extremely common (Allbutt), and later statements, that it is extremely rare (Dupré), are both erroneous. In point of fact, according to Knapp, it occurs about as often in typical paresis as it does in true tabes, and in both affections it is an early symptom of the disease. On the other hand, its development in advanced cases of paresis or tabes is extremely rare. In the majority of the cases the atrophy was clearly primary, and in no instance was the diagnosis of post-neuritic atrophy positively established. That post-neuritic atrophy may sometimes develop, however, is attested by the existence of slight neuritis in three of Knapp's cases. Finally, some visual alteration, as diplopia, failure of sight, or nystagmus, was present in thirty-three of Knapp's one hundred cases at the first examination. SYDNEY STEPHENSON.

(8A) This paper by **Schur**, of Frankfort-a.-Maine, reviews the literature at great length, and gives histories of fourteen cases. The author concludes that, except in cases of temporary pressure upon the nerve, the paralysis, with all its symptoms, is permanent. T. HARRISON BUTLER.

(9) The symptoms and pathological findings of the case reported by **Gravier**, of Lyon, were as follows.—Blindness of the left eye and nasal scotoma of the right eye. Tuberculoma of the frontal lobe and of the tuber cinereum, with secondary invasion of the chiasma and of the left optic nerve.

The most interesting point, perhaps, apart from the rarity of the lesion, is the fact that although it was possible to make a diagnosis as to the site of the lesion, the nature of it remained a mystery until the autopsy. Syphilis was denied, and the Wassermann reaction was negative. There was nothing to point to tubercle, and, although at the autopsy a very considerable involvement of the frontal lobe was manifest, this had given rise to no symptoms whatever. The exact location of the tumour in the frontal lobe is described in the article.

ERNEST THOMSON.

(10) The chief point about this irritating little communication by **Shahan**, of St. Louis, seems to be the number of misprints it contains.

SYDNEY STEPHENSON.

(11) **Holden**, of New York, remarking that retrobulbar neuritis is no longer regarded as dependent on the myelitis, but as having a common origin with it in some toxin circulating in the blood, gives a full report of his four cases, followed by a clinical summary. In this latter, he concludes that an eye may become blind within a few days without fundus changes. Vision lost may be restored in part. Later, pallor of the disc, partial or total, may be found; the margins of the disc may be blurred, the veins may be tortuous, and the arteries may have thickened walls. The field of vision in the three cases in which they could be determined were peculiar. In one there was excessive contraction of the field with fair central vision, and in two there was hemianopia for certain test objects for one eye alone. These differences he ascribes to the fact that the foci of degeneration have an accidental distribution along the arteries entering the optic nerve. The pathological changes are shown in the seven figures illustrating the article.

ROSA FORD.

(12) The patient referred to by **Hennicke**, of Gera, while under thyroid treatment for myxœdema, began to suffer from loss of the outer half of the field of vision in the right eye. The optic disc was a little congested and blurred, and the arteries were narrow. At a later date, similar symptoms attacked the left eye, and when matters were at their worst, vision in the right eye was "hand movements," and in the left 6/60. When it was suspected that the thyroid was responsible for the eye symptoms, its administration was stopped and the eyes greatly improved, but the general condition became worse. The reverse occurred when thyroid treatment was resumed.

A. J. BALLANTYNE.

(13) **Davies,** of Cardiff, gives an excellent *résumé* of some systemic affections liable to lead to changes in the optic nerves, with particular reference to nervous diseases and to diseases of the nasal accessory sinuses.

With regard to the former, the author discusses the influence of meningitis and intra-cranial tumours, including in this class gummata and abscesses. The papillœdema of cerebral tumour, which occurs on the average in about 80 per cent. of the cases, is accompanied in some 15 per cent. with radiating striæ in the neighbourhood of the macula. The onset and the intensity of the neuritis bear no definite relationship to the size or nature of the tumour. On the other hand, rapidity of growth does exercise some, through an inconstant, influence on the time of onset and the intensity of the papillitis. It appears that in the case of a tumour of the cortex, the intensity of the neuritis varies inversely with its distance from the anterior pole of the middle fossa. Papillitis is an almost constant feature in tumours of the cerebellum and temporo-sphenoidal lobe, but it is less frequently present in tumours of the subcortical regions and of the pons. There is no definite relationship between the intensity of the neuritis and the condition of the visual acuity. The retention of good sight with extreme papillœdema may be accounted for by the fact that at the fovea centralis connective tissue is almost completely absent from the retina, so that it escapes the œdema which involves the surrounding area. Is there any relationship between the onset and the intensity of the neuritis and the side of the brain affected by a growth? Different views are held on this question, but Davies believes that, as usual, truth probably lies between the extremes. It may be accepted that in tumours of the anterior half of the brain optic neuritis occurs first and is most intense on the side of the tumour. On the contrary, in tumours of the posterior half of the brain (including the cerebellum) there is no constant relationship between the onset and intensity of the neuritis and the side on which the tumour lies. As to diseases of the spinal cord likely to be complicated with optic atrophy, Davies alludes to tabes and disseminated sclerosis.

Lastly, Davies takes up the connection between optic neuritis and suppurative conditions of the accessory nasal sinuses. It is usually bilateral, and is almost invariably accompanied by a central scotoma for red and green, with or without contraction of the field for white. There are no definite ophthalmoscopic changes, inasmuch as a retro-bulbar neuritis is alone present at first. Paralysis of one or more ocular muscles is stated to be present in 33 per cent. of all cases. SYDNEY STEPHENSON.

(14) **Grüter** (Marburg).—A striking photograph of a man with a face like a mask portrays the appearance caused by atrophy of the facial muscles. In addition, there was partial ptosis, looseness of the lower lids, and some weakness of the external and internal recti. Groups of skeletal muscles were also affected. T. HARRISON BUTLER.

(15) **Adam**, of Berlin, has examined 92 cases of eclampsia during the past year at the University Clinic for Women, Berlin. About half of them showed ocular lesions; among them four had ordinary albuminuric retinitis. In these four the amount of albumin excreted remained the same after the confinement, whereas in the other cases it at once fell from, say, 15 $^0/_{00}$ to 1/3 $^0/_{00}$, and rapidly disappeared completely. These four cases are atypical and were excluded. Eighty-eight cases of typical eclampsia remained, of which 40 had ocular defects. Most of them developed complete amaurosis; a few marked amblyopia only. Both phenomena were uraemic in origin, for a prompt reflex contraction of the pupil could be obtained. Generally, blindness set in shortly before loss of consciousness, and appeared somewhat suddenly. In most cases consciousness returned hours or days before sight was restored. In 35 cases the ophthalmoscopic picture was normal. In five cases changes were noted which have so far not been described.—In isolated situations at the periphery, one noticed that the fundus appeared especially dusky, and that one or two choroidal vessels were here very prominent. These spots were not at all obvious—in fact, they might easily be taken as normal had not changes supervened which stamped them as pathological. Other vessels joined these bright choroidal vessels, the pigment layer became more transparent, and eventually a large sharply-defined tangle of sclerotic vessels was formed, just as may be seen in syphilis and arterio-sclerosis. Autopsy showed that these foci contained thrombosed vessels, and that there were hæmorrhages in the choroidal tissues.

T. HARRISON BUTLER

(16) **Greeves**, of London, reports the case of a boy of five years who was seized with vomiting and high temperature, and five days later was found to be mentally dull and to have a paralysis of one VI nerve. Conditions improving at date of report. SYDNEY STEPHENSON.

(17) **Kuhnt**, of Bonn, presents an interesting account of an unusual case of the disease described by Hutchinson as "Summer eruption" and by Bazin as "Hydroa vacciniforme." This is a very rare condition, found only in the young, characterised by the formation of papules on the face and hands which appear during the summer and disappear in the winter. The nodules vary in size from a pin's head to a bean, they are opaque and waxy, and are either covered with a crust or develop into the typical efflorescence by sinking in at the centre and spreading peripherally. The edge may be covered

with the original papules or may present vesicles. By coalescence of several of these efflorescences large *plaques*, may be formed. The whole area becomes covered with a hard crust, which, in from 8 to 14 days, tends to fall off, leaving a deep sharp-edged scar like that which follows variola or acne necrotica. In Kuhnt's case both eyes were attacked. In each a deep punched-out defect appeared in the sclera, and the left eye was rendered useless by a dense leucoma.

The communication is illustrated and accompanied by a bibliography of the disease. T. HARRISON BUTLER.

(18) **James Taylor**, of London, describes ocular paralyses in so far as they are indications of nervous disease. A few of his many points can alone be touched upon in this place. In late syphilitic affections of the ocular muscles the underlying conditions may be (*a*) a gumma of the nerve sheath, when the symptoms yield to potassium iodide and mercury, or (*b*) degenerative changes in the cells of the ocular nucleus, when they are uninfluenced by anti-luetic remedies. Taylor believes that nystagmoid jerking on outward movements of the eyes is nearly always present in alcoholic peripheral neuritis, as the result of neuritic changes in the sixth cranial nerves. In severe cases, abduction movements may be wholly lost, and he has seen both third nerves suffer in several branches. Such patients generally succumb. Diabetic ocular paralysis, which, in his experience, is not common, may be toxic or due to hæmorrhages into the sheaths of the nerves. Ocular paralysis is not very frequent in disseminated sclerosis, and Taylor has never seen complete unilateral third nerve paralysis in that disease. The author has yet to meet with a case of myasthenia where the ocular muscles were not implicated. The variability of the paralysis in myasthenia has often led to the disease being regarded as "hysterical." Ocular paralyses in intra-cranial tumour may be due to (*a*) direct pressure upon, or infiltration of, the nerve, or (*b*) general intra-cranial pressure. Taylor doubts whether there be a "rheumatic" affection of the ocular nerves. He has known cases at first diagnosed as "rheumatic paralysis of the sixth nerve," where the lapse of time showed that that condition was merely the first sign of some general affection. In conclusion, Taylor discusses affections of the optic nerve as they occur in association with intra-cranial tumour, disseminated sclerosis, diabetes, albuminuria, tabes dorsalis, and so forth. SYDNEY STEPHENSON.

(20) The case reported by **Alt**, of Saint Louis, is as follows.—After a severe hæmatemesis due to gastric ulcer, the patient had V.A. only p.l. in right eye, fingers at six feet in darkened room in left eye, widely dilated pupils, and chalky-white discs, with minute vessels. Eventually, the vision greatly improved, and, finally, after three months, R.V. fingers at 6 feet, L.V. 20/30, but with very much restricted fields. The ophthalmoscopic picture, in spite of the improvement in vision, was very much the same as before. The left pupil had recovered its reactions, the right only partially. The patient had been a driver in a brewery, and the author raises the interesting question as to what influence his previous habits had had on the causation of the comparatively sudden blindness which resulted from the hæmorrhage.

ERNEST THOMSON.

(21) **Wiegmann's** patient, a woman of forty years, after suffering for three months from whooping cough, complained of obscurations of vision. She was found to have a mild optic neuritis with fulness of the retinal veins in both eyes, and in the left two small hæmorrhages in the neighbourhood of the papilla. Vision was R. 5/5, L. 5/7·5. Recovery occurred, with perfect vision, under treatment with iron-sajodin. Syphilis, tubercle, renal disease,

and meningitis could be excluded. On the basis of this, and one or two other cases quoted, the author refers the optic neuritis to mechanical causes, repeated attacks of congestion leading to permanent stasis in the lymph and blood circulations in the nerve. The possibility that toxines from the infective agent may also play a part is mentioned. A. J. BALLANTYNE.

V.—PHLYCTENULOSIS.

(1) **Colin, A.—Phlyctenular ophthalmia in the neighbourhood of Nice.** *Revue Générale d'Ophtalmologie*, 30 novembre, 1910.

(2) **Ager, Louis C.—Is phlyctenulosis a manifestation of tuberculosis?** *Long Island Medical Journal*, June, 1912.

(1) **Colin**, of Nice, has been much struck with the very large proportion of cases of phlyctenular ophthalmia occurring in the region of Nice, and has sought whether, by any chance, the bright sunshine and the sea air and the dust have anything to do with this abnormal frequency. One need not detail the article; it will suffice to say that Colin finds that, as usual, the real cause of this disease lies in the uncleanliness, bad hygiene, and inferior alimentation of the families of these infants, who are for the most part Italians. Sun and sea breezes have, on the contrary, a most beneficial effect on the disease once the patient has been put under hygienic conditions. ERNEST THOMSON.

(2) The conclusions reached by **Ager**, of Brooklyn, are as follows:

"There is rapidly accumulating clinical evidence that tuberculous infection of the eye, particularly in the young, is much more common than has been supposed, and the percentage of spontaneous recovery in such infections is perhaps as high as in tuberculous infections in other parts of the body.

Although we are not yet justified in saying that phlyctenulosis is directly due to infection with human or bovine tubercle bacilli, it is quite possible that this will be shown later to be the case.

If phlyctenulosis is not the direct product of a tuberculous infection, the statistics of clinical investigations and of tuberculin reactions show that there is some causative relation between the two.

It follows from the previous conclusions that all children with phlyctenulosis should receive the most thorough expert physical examinations for evidences of incipient tuberculosis, and that the systemic treatment should be guided by the results of such examinations.

Inasmuch as phlyctenulosis constitutes such a large proportion of the cases seen at eye clinics, proper provision should be made for diagnosis and treatment, and tuberculosis classes should be instituted.

Since phlyctenulosis appears to be one of the signs of incipient tuberculosis, Boards of Health and Boards of Education and organizations devoted to the prevention of tuberculosis should have their attention called to this aid to diagnosis." SYDNEY STEPHENSON.

BOOK NOTICES.

Text-Book of Ophthalmology. By DR. ERNST FUCHS, Professor of Ophthalmology in the University of Vienna. Authorized translation from the twelfth revised and greatly enlarged German edition, with numerous additions by ALEXANDER DUANE, M.D., Surgeon Ophthalmic and Aural Institute, New York. With 441 illustrations. Fourth edition. Philadelphia and London: J. B. Lippincott Company. Price, $6.00 and 25s. Net. Not dated.

The main feature that calls for comment in the fourth English edition of Fuchs' *Text-Book* (translated by Dr. A. Duane from the twelfth German edition) is the addition of an introductory chapter, containing upwards of sixty pages, dealing on broad yet comprehensive lines with the physiology, pathology, and therapeutics of the eye. It would be difficult, nay, impossible, to overestimate the value of this section to the ophthalmic surgeon. That the book takes cognisance of the most modern operations is shown by the fact that Elliot's trephining and Herbert's sclerotomy as remedies for chronic glaucoma are described. For that matter, the same remark is true of almost every department of ophthalmic medicine and surgery. The numerous additions that have been made by the translator, Dr. Alexander Duane, especially to the sections which deal with refraction, operations, motor anomalies, and functional examination, add considerably to the value of the book, particularly from the standpoint of the American and English ophthalmic surgeon.

One criticism we may be permitted to allow ourselves. The present tome is a grievous burden to hold. It weighs 5½ lbs. and costs 7d. to send by parcel post. The next edition, we suggest, would be better issued as two separate volumes.

It were indeed a work of supererogation to recommend Fuchs' *Text-Book of Ophthalmology* to our readers. Dr. Duane has once again laid us under a debt of gratitude for his lucid translation.

Royal London Ophthalmic Hospital Reports. Volume XVIII, Part III, July, 1912. Edited by WILLIAM LANG. London: J. AND A. CHURCHILL, 7, Great Marlborough Street. Price 5s. net.

The present number of the *Royal London Ophthalmic Hospital Reports* bears the date of July, 1912. It is unusually stout, extending to upwards of two hundred pages, although it includes nine communications only—namely, by G. Coats (3), J. H. Parsons (2), R. A. Greeves (2), A. C. Hudson (1), and C. H. Usher (1) respectively. It is liberally illustrated. It is impossible to withhold a word of praise from the plan adopted by Mr. George Coats in the course of a communication dealing with "Local Metastasis in Intraocular Sarcoma." In the course of that paper he has occasion to relate the details of several cases, each of which he prefaces by a brief clinical and pathological summary of the leading facts. For this really thoughtful use of the summary readers should indeed be grateful. Is it too much to hope that other medical writers, particularly those who seem to revel in case-histories, may be induced to follow Mr. Coats's example?

Transactions of the Ophthalmological Society of the United Kingdom. Volume XXXII, Fasc. 2, 1912. London: J. & A. CHURCHILL, 7, Great Marlborough Street. Price 4s. net.

The second fasciculus of the thirty-second volume of the *Transactions* of the Ophthalmological Society contains several interesting communications, together with many plates and figures. Its contents will be noticed in due course in the columns of THE OPHTHALMOSCOPE.

The Extra Pharmacopœia of Martindale and Westcott. Revised by W. HARRISON MARTINDALE and W. WYNN WESTCOTT. Fifteenth Edition. In two volumes. London: H. K. LEWIS, 136, Gower Street, W.C. 1912. Volume I, price 14s. net; Volume II, price 7s. net.

When a book has reached its fifteenth edition it would be worse than superfluous to say that it fulfilled a definitely expressed want. Yet that is what the *Extra Pharmacopœia* does. The familiar single volume has now, owing to recent advances, blossomed out into two volumes, the first portly but portable, as in the older form, and the second of scarcely half the size. Volume II embodies analytical and experimental work and reports of recent investigations into the ætiology of such diseases as beri beri, cancer, gonorrhœa, syphilis, and so forth. Volume I contains everything likely to be required by physician or pharmacist in the way of immediate reference on therapeutic matters, while Volume II may be regarded as a supplement for further study. Obsolete matter has been strictly expunged.

No ophthalmic surgeon can afford to be without the two volumes of the *Extra Pharmacopœia.*

Bulletin de la Société d'Ophtalmologie d'Égypte, 1911. Alexandria: S. J. VALLINAKIS AND AP. GLOU. 1911.

The Egyptian Ophthalmological Society, which was founded in 1902, publishes in a slim, modest, paper-backed volume an account of its ninth annual meeting. It is not illustrated, and contains about a dozen brief communications, together with reports of the discussions that took place. Those of its contents that are suitable will be abstracted in these columns.

Syphilis from the Modern Standpoint. By JAMES MCINTOSH and PAUL FILDES. Illustrated. London: Edward Arnold. New York: Longmans, Green & Co. 1911. Price, 10s. 6d. net.

Syphilis from the Modern Standpoint belongs to the series of "International Medical Monographs," edited by Drs. Leonard Hill and William Bulloch. It is a book that can scarcely fail to interest the ophthalmic surgeon, since it contains a clearly written account of the present state of our knowledge of practically everything that concerns syphilis.

Drs. McIntosh and Fildes trace the earliest acquaintance with the symptoms and treatment of syphilis to the great epidemic of the disease, which originated in 1494 in Spain and Italy, and soon swept the rest of Europe. Leaving these historical considerations on one side, the authors next describe the finding of the Spirochæta pallida (now accepted as the cause of syphilis) by Fritz Schaudinn in the year 1905, a discovery upon which most of the facts added since then to our knowledge of syphilis may be said to hinge. The morphology, the staining reactions, the viability, and the cultivation of Schaudinn's Spirochæta are described, and its differential diagnosis from the S. refringens, S. gracilis, S. dentium, S. pseudo-pallida, and S. pertenuis is gone into. A chapter is devoted to a description of the newer methods of demonstrating the Spirochæta pallida in primary sores, condylomata, mucous patches, and the early ulcerative lesions of malignant syphilis. The likelihood of success is very much diminished by local, and, to a less extent, by general anti-luetic treatment. To demonstrate the living Spirochaeta from a primary or other specific lesion, the method of "dark ground illumination" is now invariably employed. The authors have discarded Burri's Indian Ink method, owing to the difficulty often experienced in diagnosing the Spirochæta pallida from other Spirochætes. At the same time they do not dispute that "when a lesion has been thoroughly cleaned, and a good sample of clear serum obtained, a discovery of numerous Spirochætes, some having the attributes of the Spirochæta pallida, will practically ensure a positive diagnosis in a very short time." To obtain a good preparation, it is essential that the smear be properly fixed with alcohol (absolute or methyl) or by osmic acid. Of the Giemsa and the Leishman stain, the authors, on the whole, prefer the former. Other methods are described. The microbe of syphilis may be demonstrated in the tissues by Levaditi's method, Levaditi and Manouélian's rapid silver method, or by Giemsa's solution. Although the results obtained can scarcely be accurately appraised at the present time, McIntosh and Fildes describe the results of inoculating syphilis into the anthropoid apes, as the Chimpanzee, the Orang-outang, and the Gibbon, into the lower monkeys, as the Macacus, the Cercopithecus, and the Cynocephalus, and into such other animals as the rabbit and the guinea-pig. It is interesting to recall the fact that Bertarelli was the first to prove that rabbits were susceptible to the virus. His results were obtained by scarifying the cornea, and then rubbing in syphilitic material. About a month later, a well-defined interstitial keratitis made its appearance, which, after lasting for a few weeks, gradually cleared up. Spirochætes were most numerous just outside the confines of the corneal infiltration, and were often found in Descemet's membrane. The experimental keratitis of the guinea-pig, the dog, and the cat was in all respects similar.

In the course of an account of the histo-pathology of syphilitic tissues, it is pointed out that certain tissues, as follows, are specially liable to be affected by the Spirochæta pallida.—(1) Delicate connective tissue structures; (2) walls of blood vessels and their immediate neighbourhood; and (3) cells of an epithelial nature.

Several chapters are devoted to the Wassermann reaction, its history, its explanation, its theories, its modifications, its clinical value, and so forth. As regards the various modifications proposed in its original *technique*, the conclusions reached by the authors are as follows:—"That any departure from the principles of the original Wassermann reaction entails a liability to error, and that the difference in the number of positive results in syphilis obtained by the Wassermann reaction and its modifications is less than appears above, when the original reaction is carried out by the best methods. It is possible that Noguchi's reaction, when performed with as much elaboration as the original reaction, does not lead to error in diagnosis, but is then no less arduous." Drs. McIntosh and Fildes doubt whether the diagnosis of syphilis in a given case is nowadays permissible in the absence of a serum examination or the discovery of the Spirochæta pallida. A positive Wassermann reaction is apparently due to cell degeneration produced by the *living* parasite. It is to be regarded as an unfailing indication for anti-luetic treatment. As a guide to the progress of cure, the qualitative reaction is, in the authors' opinion, of comparatively little value, and for that purpose quantitative estimations should invariably be carried out.

After a chapter on Chemotherapeutics (one of the clearest we have ever read) the authors pass on to consider the treatment of syphilis by Salvarsan or "606." Into this question we do not purpose to enter here; but readers may be assured that the authors omit no point of the least importance, and give, besides, a very lucid account of the new remedy, its administration, its action, and its after-effects.

Syphilis from the Modern Standpoint is illustrated by portraits of Schaudinn, Metchnikoff, Roux, Wassermann, and Ehrlich. SYDNEY STEPHENSON.

Stereoscopic Treatment of Heterophoria and Heterotropia, with a selection of Stereoscopic Charts. By DAVID W. WELLS, M.D. New York: E. B. Meyrowitz, 1912 Price not stated.

In this well-written little essay the author gives clear and concise directions for investigating and training the fusion faculty, principally by means of his stereoscopic cards.

"The power of a muscle depends not only upon its own physical properties, but upon the strength of the nervous impulses which excites its action." This is the key-note of the book. The author believes that heterophoria depends, in the majority of cases, upon abnormally weak innervation due to defective fusion sense and that fusion training gives the best hope of cure.

The stereoscopic cards have been used experimentally by the reviewer in the fusion training of squinters, and he considers them the best selection he has seen. CLAUD WORTH.

NOTES AND ECHOES.

Deaths.

WITH regret, we note the death, at the age of 76 years, of Professor Ferdinand Monoyer, of Lyons, a name very familiar to the older race of ophthalmic surgeons. An Alsatian by birth, Monoyer had worked at Strassburg, Nancy, and Lyons. At Strassburg he succeeded his father-in-law Stoeber in the direction of the ophthalmological clinique, but when that city fell into the hands of the Prussians, Monoyer went to Nancy. In 1876 he accepted the professorship of medical physics in the University of Lyons. His special work was in the domain of physiological optics. He was the first to introduce test-types and lenses on the decimal system, and to adopt the *mètre*, on which he bestowed the name of "*dioptre*." Monoyer, however, had numerous other claims to distinction. Thus, he invented a demonstrating ophthalmoscope, and translated (from the English) Donders' famous book, to say nothing of Wundt's *Physique Médicale* (1884).

Professor O. Eversbusch, director of the University *Augenklinik* at Munich, died on August 6th last.

* * * *

Distinctions.

THE honorary degree of D.Sc. has been bestowed by the University of Dublin upon Professor Ernst Fuchs, of Vienna, and Professor Alvar Gullstrand, of Upsala. The occasion was the celebration of the Bicentenary of the University.

Upon Professor Dr. Alois Birnbacher, of Graz, has been bestowed the the Order of the Iron Cross of the III class.

The title of professor has been bestowed upon the following surgeons: Dr. George Lenz, first assistant in the University Ophthalmic *Klinik*, of Breslau; Dr. Schreiber, *privat-dozent* of ophthalmology; Dr. Alfred Leber, *Oberarzt* of the University Ophthalmic *Klinik*, at Göttingen.

* * * *

Professor Leber.

THE jubilee of Professor Leber was celebrated at Heidelberg on July 18th last.

* * * *

Dr. G. J. Burch.

DR. GEORGE J. BURCH, F.R.S., of Oxford, has been granted a civil list pension of £120 "in recognition of the value of his researches in physics and physiology, and in consideration of his inability to continue his professional work owing to ill-health." Dr. Burch is well known to every reader of THE OPHTHALMOSCOPE owing to his contributions to our columns. While we deplore the immediate cause, we cordially congratulate Dr. Burch upon his well-earned pension.

* * * *

Appointments.

DR. CECIL E. SHAW has been appointed lecturer on ophthalmology and otology in the Queen's University of Belfast, Ireland.

DR. JOHN WHARTON, has been appointed ophthalmic surgeon to the workhouse and schools of the Manchester Township.

DR. H. W. LYLE, surgeon to the Royal Eye Hospital, London, has been re-elected examiner in physiology for the fellowship of the Royal College of Surgeons of England.

DR. GUISEPPI OVIO has been appointed to the chair of clinical ophthalmology in the University of Genoa.

DR. H. FRENKEL has been nominated professor of clinical ophthalmology in Toulouse, France.

DR. E. HERTEL, director of the University Eye *Klinik*, at Strassburg, has declined a call for Marburg, in succession to Dr. Bach, deceased.

Messrs. D. S. BRYAN-BROWN and P. VARDON have been appointed ophthalmic house surgeons to St. Thomas's Hospital, London.

* * * *

The Royal Medical Benevolent Fund.

HIS MAJESTY THE KING has been graciously pleased to grant to the British Medical Benevolent Fund the title of "Royal," so that it will henceforth be known as the Royal Medical Benevolent Fund.

* * * *

The Egyptian Ophthalmological Society.

IT would be interesting to know what led to the recent incorporation of the following among the rules of the Egyptian Ophthalmological Society :—

"No member of the Society shall advertize in the press contrary to professional dignity; neither shall he allow his name to be used in connection with any medication whatsoever, at least unless the product be a new one, discovered by himself, and approved by a recognized scientific society."

* * * *

The Prevention of Blindness.

WE gather from the *New York Times* of March 25th last that Dean Sumner, of Chicago, has announced that "No persons will be married at the Cathedral of Sts. Peter and Paul unless they present a certificate of health from a reputable physician to the effect that they are normal, physically and mentally, and *have neither an incurable nor communicable disease.* Commenting upon the foregoing announcement, the *New York State Journal of Medicine*, May, 1912, says :—

> "The moral effect of Dean Sumner's announcement ought to be great. It ought to arouse the medical profession to its duty. It ought to unite both theology and medicine in an earnest endeavour to reform our marriage laws so that individuals with venereal diseases should be deprived of the power to infect the innocent.
>
> "Such a law would do more to prevent blindness from ophthalmia

neonatorum than all the *Credè instillatio* which have ever been practised. It is doubtless laudable to cure disease. It is still better to prevent it altogether. Ophthalmia neonatorum is a preventable disease. Its existence is a blot on the legislature and a blot on the medical profession.

"The clergy, or one clergyman at least, is teaching both the lawyers and the doctors a much needed lesson."

* * * *

Oxford Ophthalmological Congress, 1912.

BRIGHT weather favoured the meeting of the Oxford Ophthalmological Congress, held at Keble College, Oxford, on July 18th and 19th last. The programme, as usual, was of an interesting nature. Addresses were given by Professor Straub (Amsterdam), Dr. W. B. Marple (New York), Dr. Hanford McKee (Montreal), Dr Thomson Henderson (Nottingham), and Dr. S. E. Whitnall (Oxford). The Professional Museum was of unusual interest, and included pathological specimens and clinical cases, and appliances, photographs, and specimens to illustrate many features connected with coal-mining and miners' nystagmus. Mr. A. W. Head exhibited his wonderful paintings, two hundred and fifty in number, of the fundi of mammalian and reptilian eyes. The most striking feature of the Commercial Museum was perhaps Gullstrand's demonstrating ophthalmoscope, whereby a wonderfully pure image of the fundus is readily obtained. Various operations were demonstrated by Dr. van Lint, Dr. T. Harrison Butler, Mr. C. Higgens, andMr. N. B. Harman at the Oxford Eye Hospital. The official dinner, presided over by the Warden of Keble College, was held on July 18th. Year by year the Congress becomes more and more international in its character. On this occasion the American visitors included Dr. Howard F. Hansell, of Philadelphia, Dr. W. B. Marple, of New York, Dr. Myles Standish, of Boston, Dr. Joseph A. Andrews, of New York and Santa Barbara, Dr. Green, of Dayton, Ohio, and Dr. W. Likley Simpson, of Memphis, Tennessee. Canada was represented by Dr. Hanford McKee, of Montreal. From the Continent of Europe came Professor Straub, of Amsterdam, Dr. Karl Liebrecht, of Hamburg, Dr. L. Verrey, of Lausanne, Dr Fritz Brandès, of Antwerp, Dr. H. Coppez, of Brussels, Dr. van Lint, of Brussels, and others. Altogether, a pleasant and very instructive meeting.

* * * *

Miners' Nystagmus.

AN important discussion on Miners' Nystagmus (Neurosis) was opened by Dr. T. Harrison Butler, of Leamington, at a meeting of the Congress, held on July 19th last at the Oxford Eye Hospital. Amongst those who took part in the discussion were Dr. Josiah Court, of Staveley; Mr. H. S. Elworthy, of Ebbw Vale, Mon.; Dr. T. Llewellyn, of Bargoed, Glam.; Mr. J. Jameson Evans, of Birmingham; Mr. R. J. Coulter, of Newport, Mon.; Mr. H. H. Folker, of Hanley; Mr. S. McMurray, of Stoke-upon-Trent; Dr. A. C. Norman, of Sunderland; Mr N. C. Ridley, of Leicester; Mr. Stanley Riseley, of Sheffield; Mr. Bernard Cridland, of Wolverhampton; and Dr. H. Tomlin, of Shirebrook, Derbyshire. The following resolution, adopted unanimously by the meeting, shows, among other things, how completely professional opinion has changed during the last twenty years with respect to the causation of the condition:—

"*That, in opinion of the Congress, the character of the illumination is the chief factor in the production of Miners' Nystagmus, and that a Departmental Committee should be appointed to make enquiries into, and to report upon, the exact conditions under which the disease occurs.*"

* * * *

Electric Lamps for Miners.

In connection with the foregoing resolution it is interesting to note that the awards have just been issued in the Home Office competition for a prize of one thousand pounds for the best electric lamp suitable for miners. The prize has been divided among nine competitiors—the first, a German subject, receiving £600, and the others, whose lamps are stated to "possess considerable merits," £50 each.

* * * *

Examination for the Diploma in Ophthalmology. Oxford.

The following gentlemen satisfied the examiners at the recent examination for the Diploma in Ophthalmology of the University of Oxford:—

B. G. S. Acharya; J. M. Browne; A. B. Cluckie; J. N. Daggan; D. V. Giri; W. L. Simpson; and A. E. Verrey.

The examination papers are given below:—

Pathology.

1. Describe the staining reactions, method of culture, and mode of differentiation of Fränkel's Pneumococcus. To what affections of the eye may it give rise?
2. Describe the pathological changes occurring about the entrance of the optic nerve into the eye in axial myopia.
3. Describe the complications which may arise in connection with the lens capsule after extraction of Cataract.
4. Describe fully the appearances seen in the specimen under the microscope.

Relation of Ophthalmology to General Medicine.

1. Describe the ophthalmoscopic changes which occur in connection with spleno-medullary leukemia.
2. What are the ocular symptoms connected with Graves's disease, and how are they brought about?
3. Describe the ocular affections which are produced by thrombosis of the cavernous sinus.

Diagnosis, Etiology, Treatment, etc.

1. In what position does an ivory exostosis of the orbit usually originate? For what affections might it be mistaken, and how could a differential diagnosis be arrived at? Under what circumstances would you expect to be able to effect the removal of such a growth?
2. Describe the appearance, course, and treatment of a Mooren's ulcer of the cornea.
3. How could you differentiate from the ophthalmoscopic appearances between a case of retinitis pigmentosa and one of syphilitic choroido-retinitis?
4. Describe the operation you would perform for exenteration of the contents of the orbit.
5. A man presents himself with loss of sight in one eye of recent origin, considerable increase in the intraocular tension, and haze of the cornea, so that the details of the fundus cannot be seen. Discuss the diagnosis and treatment.

Dioptrics.

1. Describe the optical principles of retinoscopy with a plain mirror.
2. Describe what is meant by the spherical aberration of a lens, and state the conditions under which it is met with in the eye.
3. State the position of the various foci of convex and concave lenses.

* * * *

Ophthalmology in London.

OPHTHALMIC affairs were busy in London during the merry month of July. The ophthalmic dove-cots of the metropolis have been fluttered as they were never fluttered before! The trouble began by a specially convened meeting of the Ophthalmological Society of the United Kingdom (July 11th) called, at inconveniently short notice, to discuss the advisability of amalgamating with the Royal Society of Medicine. This momentous step was unanimously advised by the Council of the Society. It was proposed by Mr. Edward Nettleship, and supported, with what seemed some little unnecessary emphasis, by several speakers. The meeting, as a whole, was, however, lukewarm; and general relief was experienced when the following resolution, proposed by Mr. E. Treacher Collins, and seconded by Mr. Priestley Smith, was adopted by a majority of eleven votes:—

> "*That this meeting views with sympathy the proposal to form an Ophthalmological Section of the Royal Society of Medicine, and it is desirous of removing any obstacle thereto, and therefore requests the Council of the Ophthalmological Society to consider the advisability of so altering its rules, that its meetings may be held each year during the course of one week, as is done by other National Ophthalmological Societies.*"

The next step was taken with characteristic promptitude by the Royal Society of Medicine, which very shortly after the meeting of the Ophthalmological Society, issued a circular declaring its intention of forming a Section of Ophthalmology. In furtherance of this step, a meeting was held on July 26th last, when the new Section was duly constituted. The following were elected the first office-bearers of the new Section of Ophthalmology:—

ROYAL SOCIETY OF MEDICINE.

SECTION OF OPHTHALMOLOGY.

COUNCIL.

President.—Sir Anderson Critchett, Bart., C.V.O., F.R.C.S.Ed.

Vice-Presidents.—Edward Nettleship, F.R.C.S.; J. B. Lawford, F.R.C.S.; Walter H. H. Jessop, F.R.C.S.; and F. R. Cross, F.R.C.S.

Hon. Secretaries.—J. Herbert Parsons, F.R.C.S., and Leslie Paton, F.R.C.S.

Members of Council.—William M. Beaumont; George A. Berry, F.R.C.S.Ed.; Elmore W. Brewerton, F.R.C.S.; E. Farquhar Buzzard, M.D.: George Coats, F.R.C.S.; E. Treacher Collins, F.R.C.S.; J. Herbert Fisher, F.R.C.S.; Percy Flemming, F.R.C.S; Leonard G. Guthrie, M.D.; Lt.-Col. Herbert Herbert, F.R.C.S., I.M.S.; William Lang, F.R.C.S.; Arnold Lawson, F.R.C.S.; William T. Lister, F.R.C.S.; George MacKay, F.R.C.S.Ed.; William T. Holmes Spicer, F.R.C.S.; James Taylor, M.D.; Charles Howard Usher, F.R.C.S.Ed.; H. Secker Walker, F.R.C.S.

* * * *

The inaugural meeting of the newly-formed Section of Ophthalmology of the Royal Society of Medicine will be held on Wednesday, October 23rd, at 8.30 p.m. All registered medical practitioners are eligible as members of this Section. The Council of the Society has resolved to offer special terms to new members of this Section, who also become Fellows of the Society. These terms can be obtained on application to the Secretary of the Society. Only those whose applications for either Fellowship or Membership have been received on or before October 5th, and have been accepted by the Councils of the Section and of the Society, will be qualified to take part in the inaugural meeting.

THE OPHTHALMOSCOPE.

A MONTHLY REVIEW OF CURRENT OPHTHALMOLOGY.

VOL. X.—No. 10.] *OCTOBER 1, 1912.* [TWO SHILLINGS.

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ORIGINAL COMMUNICATIONS.

A CASE OF ULCERATIVE KERATITIS CAUSED BY THE BACILLUS OF DIPHTHERIA.

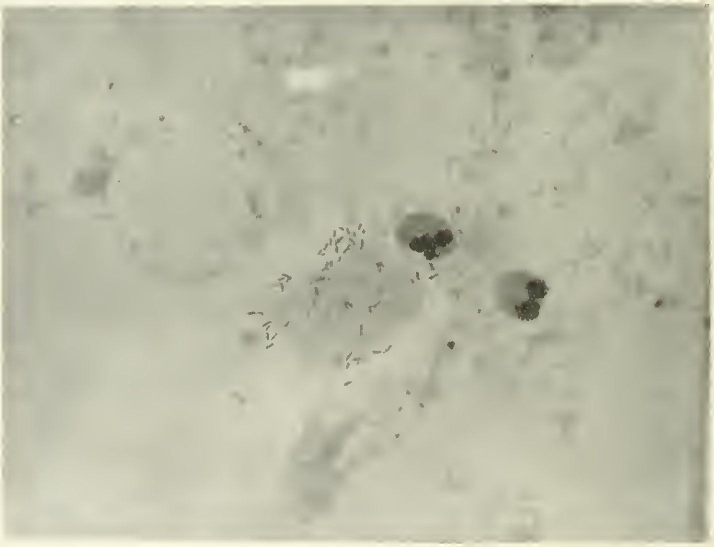
BY

LESLIE BUCHANAN, M.D.

SURGEON TO THE EYE INFIRMARY, GLASGOW, SCOTLAND.

ON the 23rd of May, 1912, I saw at the out-patient department of the Eye Infirmary, Glasgow, a man, J. B——, aged 69 years, a labourer, who stated that his left eye had been sore for some weeks past. There was no history of injury.

The eyelids were congested, but not œdematous or thickened, and there was a moderate amount of puro-mucous discharge. The palpebral conjunctiva was congested, but neither ulcerated nor cicatricial-looking, and there was no trace whatever of adherent membrane. The ocular conjunctiva was congested, but showed no other change.



B. Diphtheriæ in Scraping. (× 1000)

The cornea was ulcerated over its lower third, and the ulcerated area presented appearances which were so peculiar as to attract attention at once. The surface of the ulcer was slightly raised, and was composed of a shining, greyish-yellow, sloughy material in which were seen two or three little flecks of what looked like blood-clot. The upper part of the cornea was quite clear, and through it blood was seen lying in the anterior chamber. The appearance of the slough at once suggested to me that the ulcer looked like a diphtherial patch, and a scraping was forthwith taken and stained with carbol-thionin. In the preparation very numerous organisms were found which had the characteristic appearance of a diphtheroid bacillus (*see* figure). No other organisms were seen.

A culture was made on blood serum and sent to the City Bacteriologist for examination and report (the Eye Infirmary has not an animal license).

Meanwhile, the man was taken into the Infirmary and treated as diphtheria until a positive statement could be obtained. No antitoxin was used, however. Dr. R. M. Buchanan, Bacteriologist to the Corporation of Glasgow, reported in a few days that "The culture submitted by you yesterday, marked 'J. B.,' has been examined and a bacillus morphologically resembling B. diphtheriæ has been found. This bacillus will be isolated and tested biologically for virulence, when a further report will be sent."

The ulcer meanwhile continued to extend, in spite of treatment by cleansing and the use of antiseptics, until fully half the cornea was involved, and there were blood and pus in the anterior chamber. The intraocular tension was slightly below normal, but I did not think that the ulcer had perforated. The edges of the ulcer were slightly excavated and the floor slightly elevated, leaving a faintly marked groove round the ulcer margin. The remaining part (upper half) of the cornea was quite clear. There was little chemosis, but no pain, and the man had no constitutional disturbance.

On the 29th May a further report was received from Dr. R. M. Buchanan which ran as follows.—"With reference to report of the 25th May on the culture from the eye of "J. B.", I have now to inform you that the organism isolated has been proved virulent in a guinea pig, and that it is therefore to be regarded as the bacillus of diphtheria."

The patient was then removed by the Sanitary Authorities to Belvidere Fever Hospital and was treated as a case of diphtheria.

By the courtesy of Dr. Johnstone, Medical Officer of the Hospital, I am able to give an extract report on the progress and treatment of the case :

"Patient J. B—— received 4,000 units of diphtheria antitoxic serum (P. D. & Co.) subcutaneously immediately after admission. Since then the condition has improved continuously. The ulcerated surface appears to be healing up."

This is dated the 4th of June 1912, only four days after the injection of antitoxin. Since this date the eye has done quite unusually well, and the patient has been seen at the out-patient department of the Eye Infirmary with a well-cicatrized leucoma.

Remarks.

This case is particularly interesting in view of the seeming intimate connection between the ulcer and the bacillus of diphtheria, in so far as this was the only organism found in the film and also the principal organism* found in the culture, and, further, as the turning-point in the history of the ulcer was the injection of the antitoxin.

The fact that the patient was an old man is of interest, and it may be noted here that there was no evidence of nasal, faucial, or laryngeal diphtheria present, nor any history of diphtheria in the neighbourhood in which the patient lived.

On looking up the facts regarding the action of the bacillus of diphtheria in connection with ulceration of the cornea, Axenfeld's work[1] has been the chief source of information. The principal points noted in it are as follows.—The author relates the experiences of Coppez, which went to indicate that the toxins of B. diphtheriæ, if applied for a sufficient time to the cornea of a healthy animal (rabbit) could cause opacity and ultimately sloughing. "Diphtheria in man," says Axenfeld at page 203, "never reaches this stage by the action of its toxin alone, although the way is thus prepared for a secondary infection." Further down on the same page, he says, "For this reason a suppuration, when it has already begun, is not influenced by the serum treatment in other respects so generally efficacious," alluding, of course, to the fact that ulceration is caused by organisms other than B. diphtheriæ. Again, at page 329, "although a conjunctivitis caused by Loeffler's bacillus is influenced very beneficially by the use of Behring's antitoxin serum, the infiltrations of the cornea which are present at the time of the serum injections do not disappear so rapidly." Axenfeld then goes on to argue that, whilst the toxins of the B. diphtheriæ may act in a deleterious manner on the corneal tissue and prepare the way for another and pyogenic organism, they cannot, unaided, give rise to ulceration. On page 203, Uhthoff is mentioned as having shown by experiment that, under certain circumstances, severe corneal infiltrations can be set up in certain rabbits by the B. diphtheriæ alone.

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* Dr. R. M. Buchanan informs me that he found the B. diphtheriæ in practically pure culture in the tube forwarded to him. No other organism, at all events of pathogenic nature, was present.

Weeks[2] gives the Klebs-Loeffler bacillus as one of the organisms found in marginal and crescentic ulceration of the cornea.

Macnab[3] merely mentions the fact that the Klebs-Loeffler bacillus is found in cases of corneal ulcer, but makes no pointed remark as to the *rôle* played by the organism in the ætiology of the disease.

From the purely clinical standpoint, little is to be gained in the way of information on this very interesting point. In such excellent papers as those by W. H. H. Jessop[4] and Sydney Stephenson[5] respectively there is merely the statement that the organism was present, or that it was found by animal experiment to be present. Stephenson brings out some points which are of interest in the general view of the condition, as, for instance, that in 30·23% of cases of membranous conjunctivitis of all grades of severity, the cornea became hazy or was ulcerated. In several of this writer's cases, where the presence of the B. diphtheriæ was proved, the cornea remained clear, whilst in others in which there is a definite statement that a mixed infection was found, the cornea became ulcerated. In the majority of cases in which the cornea was ulcerated, the area involved was at the lower part (as in my case).

Jessop says very little about ulceration of the cornea, but in case[4a] and case[4b], where the virulence of the organism was proved, and where the staph. albus were present with it, the cornea remained clear.

In view of what has been extracted from Axenfeld's work, the present case seems to be of special interest and importance. It is admitted that the history is defective in so far as it cannot be ascertained whether or not the patient previously had diphtheria which affected the conjunctiva, and which left the ulcer of the cornea.

None the less, the point of interest is that an ulcer of the cornea of highly malignant nature, in so far as it advanced markedly and rapidly during the few days the patient was under my care, began to heal at once after a single injection of diphtheric antitoxin, and rapidly became cicatrised in spite of the age of the patient.

It would, therefore, seem to be possible that corneal ulceration may be caused by the bacillus of diphtheria, and, in consequence, that the use of the antitoxin must still be regarded as essential in the treatment of cases in which the bacillus is present.

REFERENCES.

1. **Axenfeld.**—"The Bacteriology of the Eye." Eng. edit. (MacNab), 1908, pp. 203 and 329.
2. **Weeks.**—"Diseases of the Eye." 1911, p. 267.
3. **MacNab.**—"Ulceration of the Cornea." 1907, p. 116.
4. **Jessop.**—"Membranous Conjunctivitis." (a) *Transact. Ophth. Soc.*, 1895, p. 55; and (b) *Transact. Ophth. Soc.*, 1902, p. 41.
5. **Stephenson.**—"Diphtheria of the Conjunctiva." *Transact. Ophth. Soc.*, 1902, p. 59.

THE NASO-LACRIMAL CANAL: THE EXTENT TO WHICH IT IS FORMED BY THE MAXILLA, AND THE INFLUENCE OF THIS UPON ITS CALIBRE

BY

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THE naso-lacrimal canal is formed in greater part by the sulcus lacrimalis of the maxilla, the gap between the lips of which on the medial or nasal side is completed normally by the descending process of the lacrimal bone above articulating with the lacrimal process of the inferior turbinated bone below (fig. 2). The extent to which these two processes take part in the formation of the medial wall of the canal is variable and is compensated by the degree of development of the lips of the sulcus lacrimalis.

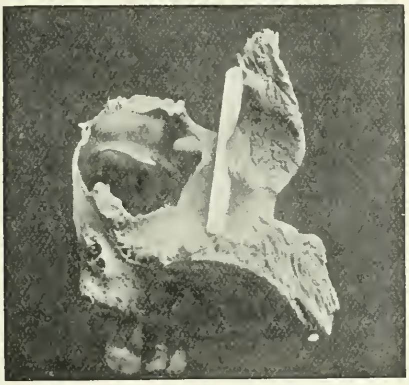

FIG. 1.

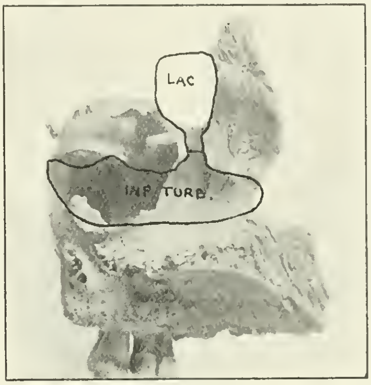

FIG. 2.

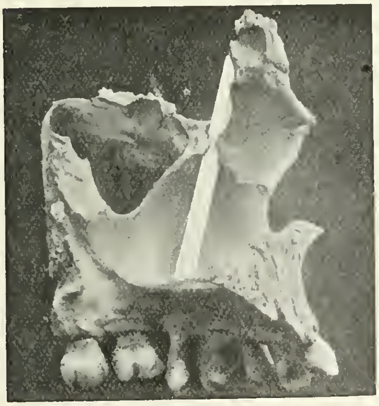

FIG. 3.

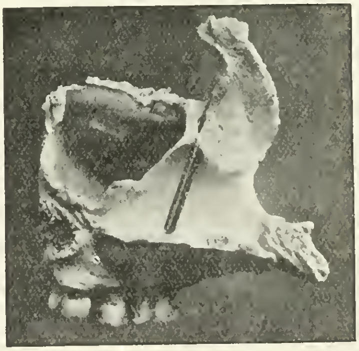

FIG. 4.

Left maxillæ viewed from nasal side. Figs. 1, 3, 4, illustrate different degrees of formation of medial wall of naso-lacrimal canal by approximation of lips of sulcus lacrimalis. Fig. 2 shows in outline completion of this wall by descending process of lacrimal bone articulating with lacrimal process of inferior turbinated bone.

Usually the sulcus forms about three-quarters of the circumference of the canal, bounding it on the posterior, lateral, and anterior aspects, as well as forming part of its medial wall. Here the edges of the sulcus are separated by an interval of about 4 mm., as seen in fig. 1, which shows the condition found in thirty-one specimens out of fifty adult European maxillæ examined, and which consequently may be taken to represent the more common type. The anterior lip (margo-lacrimalis) of the sulcus forms a much greater part of the medial wall of the canal than does the posterior lip (lunula lacrimalis) and may help to form a deep bay curving forwards from above downwards in which the naso-lacrimal duct is lodged The canal in these cases is always roomy (an antero-posterior diameter of about 8 mm. was found in the centre of several) and there is nowhere any marked narrowing of the calibre.

In a less number of specimens examined (twelve out of fifty) the lips of the sulcus approached one another more closely, to within 1 or 2 mm. (fig. 3) thus forming a greater part of the medial wall of the canal, the amount contributed by the lacrimal and inferior turbinated bones being reduced in consequence. The canal in these cases was a little less roomy than in the former, but, again, no definite narrowing of the lumen was noted.

In seven instances out of the fifty, the lips of the sulcus met and fused (fig. 4), and the central part of the canal, was formed entirely by the maxilla, leaving only a small part of the medial wall above to be completed by the lacrimal bone. This wall was ridged right across by the crista lacrimalis with which the inferior turbinated bone articulated. The feature of particular interest is that whilst in six of these seven bones the canal, as a whole, was much narrower than in the other specimens, no less than four presented a decided constriction of the lumen in the central part of the canal, which measured 3 mm. in diameter in the example illustrated in fig. 4. In one case the condition was found in both maxillæ of one skull. Whilst the naso-lacrimal duct enclosed in such a narrowed canal may have been pervious, it is obvious that a slight cause would lead to its occlusion.

Although fifty is a very small number of specimens to base statements upon in the case of such an extremely variable structure as the naso-lacrimal canal, and although it may be unjustifiable to draw any distinction between the first two groups described above on account of possible damage to the fragile lips of the sulcus in the preparation of the bone, yet in view of the fact that in all those cases (forty-three) where the lips of the sulcus did not meet, no definite narrowing of the canal was found, whilst it existed to a marked degree in six out of seven bones where the lips did meet, it seems permissible to conclude that *narrowing of the naso-lacrimal canal is specially prone to occur in those cases where it is almost entirely formed by the meeting of the edges of the sulcus lacrimalis of the maxilla.*

In connection with this, Zabel (*Anat. Hefte.* Merkel u. Bonnet I. 15, 1900. S. 153) in a full account of the variations of the lacrimal bone, notes that in some skulls where this bone is rudimentary or absent, the lacrimal fossa is shallow and reduced, and the naso-lacrimal canal narrowed transversely. I have been able to examine twelve such skulls, and found that seven of these presented shallow lacrimal fossæ with markedly narrow naso-lacrimal canals.

TUBERCLE OF THE CHOROID IN TUBERCULOUS MENINGITIS.*

BY

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THE cases of tuberculous meningitis which I have observed—and on the examination of which the following brief paper is based—have been at the Babies' Hospital, New York City. In 1908 there were fifteen cases; in 1909 forty-five cases; in 1910 twenty-eight cases; and in 1911 forty cases; or, one hundred and twenty-eight cases in these four years.

Although our records were not formerly kept with the care with which they are now, I could never until recently discover tubercles in the choroid in more than 5 per cent. of the cases; certainly, the percentage has never been as high as 20 per cent. I have referred to this subject on several occasions in our New York and American Ophthalmological Societies, and from the remarks made in the discussion by numerous colleagues, I have become convinced that my experience and figures agreed in the main with those of my American *confrères*; so that the statistics of Dr. George Carpenter and Mr. Sydney Stephenson, of London (*Reports of the Society for the Study of Disease in Children*, Vol. I, 1901, p. 169), who stated that they found the choroidal lesions in 50 per cent. of their cases, I had always felt were too high. Notwithstanding the statistics of those observers, I was not convinced that my own figures, agreeing, as they did, with those of my American colleagues, were at fault

The examination with my electric ophthalmoscope is not only very much easier, but also very much more satisfactory, than with any ordinary reflecting ophthalmoscope. Then, there is no class of infantile patients in which an ophthalmoscopic examination is as easy as it is in these patients, for most of the children, on admission, are apathetic and motionless. In a few cases I have found the dryness of the cornea somewhat of an obstacle to a thorough examination, but generally irrigation with a normal salt solution has enabled me to complete the examination to my satisfaction. Weak atropine solution was invariably instilled previously, and the examinations were always made in a most painstaking and careful manner. We have an excellent arrangement at the Babies' Hospital, New York, by means of which the bottom of the cribs can be raised or lowered to any desired height.

It was the difficulty I formerly encountered in examining these very young children at the Babies' Hospital which led me, several years ago, to experiment with the electric ophthalmoscope, and ultimately to devise one which I, and many of my colleagues in various countries, have found most satisfactory. No one who has not done it over and over again, as I have done, can have any idea of the difficulties to be encountered, or the patience necessary to make a satisfactory fundus examination with the old reflecting ophthalmoscopes in the case of a screaming, wriggling baby. On one side stood a nurse holding a lamp in the dark room; here stood another nurse trying to hold the howling youngster still; and here stood the weary, perspiring "man with the ophthalmoscope," trying to reflect a little light into the infant's eyes as opportunity offered. Very often the scene was made even more ludicrous by one or two more nurses standing to the doctor's right or left, shaking a bunch of keys, or tapping a bell, so as to get the *enfant terrible* to look in the right direction. All were perspiring; all were indulging in mental profanity, and wishing the yelling brat at the bottom of the sea, and from ten minutes to half an hour was consumed, and even then one not infrequently had to give up the job and try again another day. How different that has all become!

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* A communication made to the Oxford Ophthalmological Congress on July 18th, 1912.

When a fundus examination has now to be made, I know that it will be easily completed in five minutes or less. The bottom of the crib is raised till the child is lying a little below the level of my shoulders; I then stand by the side of the crib, and, with my electric ophthalmoscope and a small storage battery, examine with the greatest ease first one eye and then the other, and that, too, without even darkening the room at all. Of course, it is equally convenient in examining (as one often has to do) private patients at home who are confined to their beds.

Carpenter and Stephenson emphasized the importance of the ophthalmoscope as an aid in the diagnosis of these cases. Until recently, however, this point had not seemed to me of very great moment, because at the Babies' Hospital, as soon as the patient was admitted, a lumbar puncture was promptly made, and the cerebro-spinal fluid examined for tubercle bacilli. So that, in most of the cases in previous years, when I have been called to examine the eyes of these little patients, the diagnosis has already been made by the pathologist of the Institution.

I had often thought of the great disparity between Carpenter and Stephenson's figures (50 per cent.) and those of my own and numerous American *confrères* (5 per cent. or less). I had gone over and carefully considered the various sources of error, in order to eliminate these to as great a degree as possible. Atropine in weak solution was always instilled. I always used my electric ophthalmoscope, seeing the fundus of each patient most clearly, and spending sufficient time on each case to be able to take an affidavit as to whether tubercles were or were not present. Nevertheless, my figures remained just the same, *viz.*: 5 per cent. or less. There was only one other thing that I could think of, and that was to make the examinations more frequently.

In the fall of 1911, therefore, I determined that a way must be found of securing a more frequent fundus examination of these cases. It was evident that if these were made only by myself or by one of my assistants, all of whom were closely occupied with other duties, it was not practicable to have them made oftener than once in twenty-four hours. I therefore concluded to make the experiment of having the fundus examinations by myself and my assistant supplemented by others made by the resident house staff. The occasion seemed to be especially opportune, inasmuch as the hospital directors had decided in the fall of 1911 to have the positions on the resident staff filled by recently graduated medical men, instead of medical women, as had previously been the case. The new house physician was a man exceptionally well qualified for the position, and soon became greatly interested in the subject. I presented one of my electric ophthalmoscopes to the Institution, in the use of which, after some little coaching on my part, the house physician soon became adept, and familiar with the appearance of the normal fundus and of tubercles in the choroid.

Previous to January 1st, 1912, all fundus examinations were made either by myself or by one of my assistants, never by the resident staff. The result was that the eyes of these patients were seldom examined oftener than twice, and often only once, for in many cases the patient was dead when one of us returned the following day for a second examination, as many children live only

TUBERCLE OF THE CHOROID IN TUBERCULOUS MENINGITIS.

BY

WILBUR B. MARPLE, M.D.

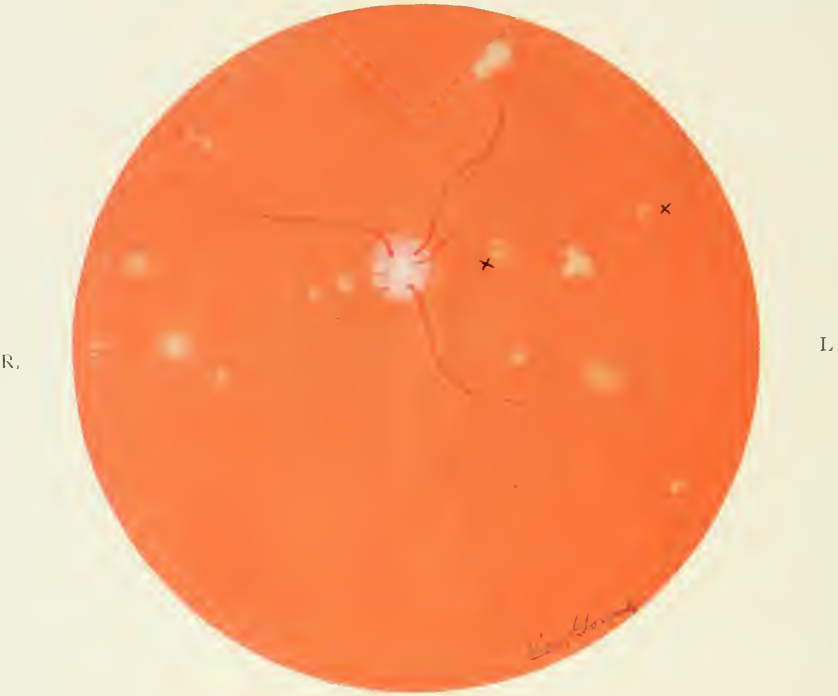

FIG. 1.

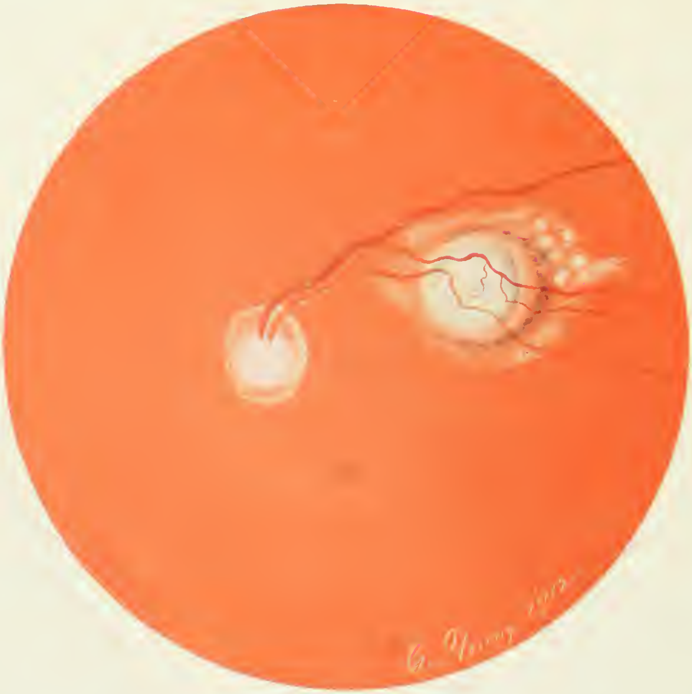

FIG. 2.

a day or so after admission to the Institution. For this reason, *viz.*, on account of the infrequency of the examination, as I now know, tubercles were seldom discovered in the fundus (as previously stated, in not more than 4 or 5 per cent. of the cases). Now the house physician, being always on the spot, investigates every case with the electric ophthalmoscope several times a day until he discovers the tubercles, and I or one of my assistants have corroborated his observations in every instance. Carpenter and Stephenson reported that they found tubercles of the choroid in 50 per cent. of the cases of tuberculous meningitis, and furthermore stated it as their belief, that if the cases were examined with sufficient care and frequency, the percentage might be much higher. I take great pleasure in here stating that these gentlemen were quite right, and that, as the result of these more frequent examinations at the Babies' Hospital, I have changed my opinion entirely as to the percentage of the cases in which these fundus lesions occur. From January 1st, 1912, to June 30th, 1912, we have had nineteen cases at the Babies' Hospital. Of these nineteen cases the first four were not examined, another was admitted in general convulsions, and died six hours later, and another was moribund on admission, so that an examination could not be made. This leaves thirteen cases, which have been carefully and repeatedly examined, and in each case the fundus lesions were found—that is, the examination was positive in thirteen consecutive cases, giving a percentage of a hundred. It cannot, therefore, be sufficiently emphasized that statistics based on infrequent examinations are worthless, and that if such frequent and careful examinations are made, the lesions will be found, as Carpenter and Stephenson predicted, in practically all cases (if they live long enough).

In several cases which we have examined on successive days, tubercles—one or more—were found which were not present the day before, or in the second eye where they were present in only one eye the day before. In the illustration which I now show (Fig. 1 on coloured plate) you will see several lesions checked with a cross, none of which was present on the day before. The other eye presented a similar picture. One case I examined very carefully at 6 p.m. and found nothing. At 10 p.m., or four hours later, the house physician telephoned me that he had just discovered a tubercle where nothing was present four hours previously, and his observation was corroborated by myself the following day.

As to the ophthalmoscope as a diagnostic aid, I do not consider that it plays as important a *rôle* as it undoubtedly did before the days of lumbar puncture and the microscopic examination of the cerebro-spinal fluid. Nevertheless, it is of some aid, for in four of our cases the ophthalmoscopic diagnosis of tubercle was made before the laboratory report had been received. In one case a similar ophthalmoscopic diagnosis was made where the examination of the cerebro-spinal fluid was negative, and the patient died before another lumbar puncture could be done, so that in this case the diagnosis was made by the ophthalmoscope.

There is one point to which I would like to refer.—In other forms of choroiditis, as exudative choroiditis, we generally find a more or less numerous exudation on Descemet's membrane. Although I have looked for this repeatedly in these cases of tuberculous meningitis with tubercles of the choroid, I have never found it in a single case.

With few exceptions, the choroidal lesions in these meningitis cases have been small, miliary tubercles, round or oval in shape, rarely of an irregular shape, of a greyish, or greyish-white colour, and usually without any pigment (*see* plate) as though the retinal pigment epithelium had been gently brushed away, leaving, as Carpenter and Stephenson call it, a "moth-eaten" edge.

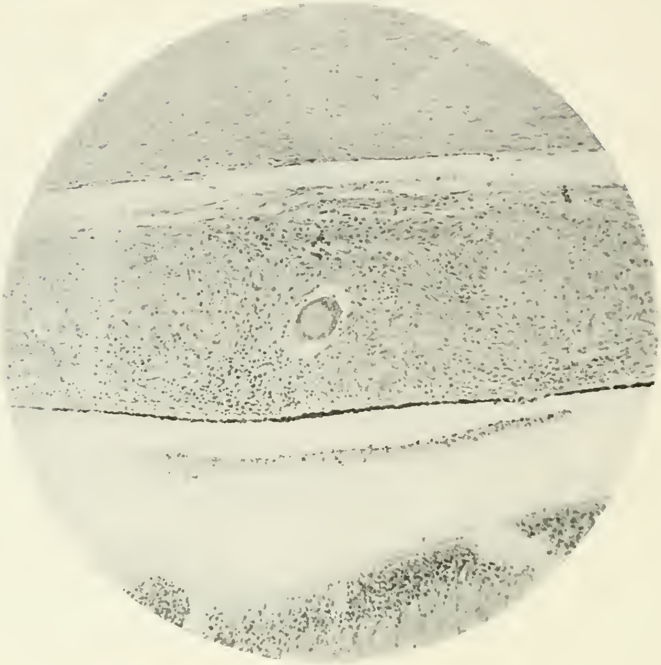

FIG. 1.

Micro-photograph of section of right eye shown in Fig. 2 on plate (× 95).

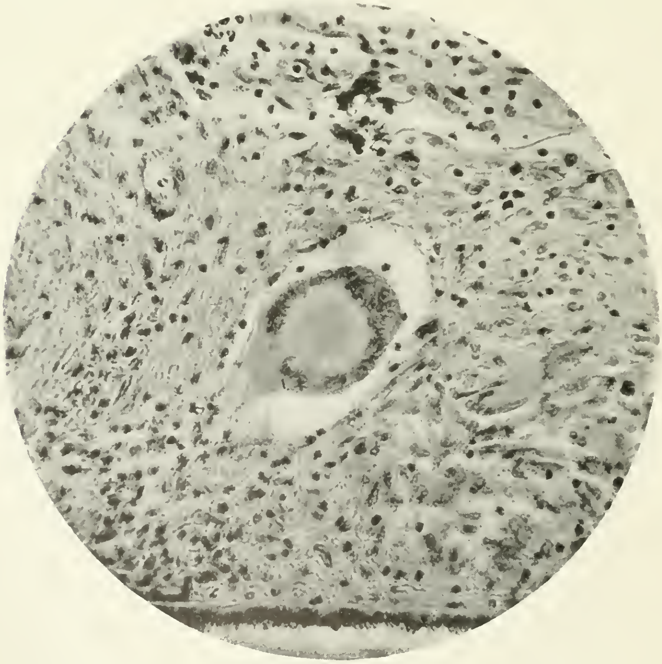

FIG. 2.

Same as Figure 1, more highly magnified (about × 275).

Retinal vessels are frequently seen passing undisturbed in outline across their surface. In size, the tubercles vary from a speck, the breadth of a primary retinal vessel, to that of a mass the size of the optic papilla, or larger. Most of those I have seen have been about 1/4 the diameter of the optic disc, or smaller. I recently saw one just about the size of the optic papilla. The lesion in the case pictured in the illustration (Fig. 2 on coloured plate) which is here shown, and sections of which are also shown (Figs. 1 and 2 in text), was 2½ disc diameters in breadth. In this case the large mass was evidently old, with several small recent foci at the upper right border. Often we find one, less frequently, several ; in the greater number of cases they are limited to one eye only. Of the first nine cases examined this year, six showed tubercles in one eye, three showed them in both eyes. I have seen one in one eye alone on one day, and the next day several in this eye, and one in the other eye. They are generally situated in the neighbourhood of the optic disc or yellow spot, within one to three disc diameters from the latter. I have never encountered them in the extreme periphery alone, and but one as far out as 6 or 7 P. D. diameters from the disc. Papillitis was found in four of the nine cases observed this year, and in three of these four cases there was double papillitis, always of a mild form.

Course.—We only observe the cases a short time, and not infrequently the children are moribund on admission. Of the nine cases in the first quarter of 1912, one lived ten days, one seven days, and the rest from one to four or five days.

Conclusion.

Of course, I appreciate that thirteen cases is a somewhat small number on which to base conclusions. But in all respects except one, *viz.*: their frequency, the examinations were conducted in exactly the same manner as in previous years. The fact that with this single change the percentage jumped from 5 to 100, leaves one in no possible doubt as to the importance of frequent examinations, and also proves conclusively the correctness of the prophecy made by Carpenter and Stephenson several years ago. I believe this is the first published report showing such a high percentage of tubercles found.

In conclusion, I wish to thank my assistant, Dr. George Young, for his aid in the examination and for his beautiful drawings, and Dr. Alan Brown, the house physician, for his industry and perseverance in keeping watch on the cases. The excellent micro-photographs of the sections of the eye (which were prepared by Dr. Wallstein in the Laboratory of the Babies' Hospital) are the work of Dr. George Dixon, pathologist of the New York Eye and Ear Infirmary.

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THE SLIDING FLAP OPERATION IN THE REMOVAL OF CATARACT*

BY
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Prefatory.

THE classic operation for cataract described in all treatises on ophthalmology generally yields excellent results. Despite the depth of the anterior chamber, the tremulousness of the iris, and the greater blackness of the pupil, there is nothing externally to distinguish an eye thus operated upon from an ordinary eye, and a correcting lens gives normal visual acuity. Unhappily, the results are not always equally perfect. Occurrences during and after the operation which jeopardise the complete result are numerous. During the operation we fear more especially prolapse of the iris and infection of the wound. Prolapse of the iris may lead to iritis; it is a danger of infection, a constant menace of increased tension; it produces a very pronounced astigmatism; and may abrogate vision by drawing the pupillary opening upward. The infection of the wound may be acute and lead to panophthalmitis, or it may be chronic, provoking irido-choroiditis, and leading to atrophy of the eyeball.

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*Based upon a demonstration of the operation given at the Oxford Ophthalmological Congress on July 18th, 1912.

In order to avoid prolapse of the iris and infection (dangers which menace all eyes operated on for cataract), numerous modifications of the classic operation have been recommended. Those which are directed solely against hernia of the iris are:—

1. Iridectomy.
2. Suture of the cornea.
3. Conjunctival flap.

The others aim at protecting the eye against infection, as well as preventing prolapse of the iris. They are:—

1. The conjunctival pouch.
2. The conjunctival purse suture.
3. The pedunculated conjunctival strip.

All of the foregoing modifications present inconveniences.

1. *Iridectomy*, which consists, of course, in excising a part of the iris precisely at the spot where there is a tendency to protrusion from the wound, appears to be the ideal way of avoiding hernia. Such is not the case—the angles of the iridic coloboma frequently become incarcerated, which results in a permanent menace of glaucoma. From an æsthetic point of view, again, the mutilation of the iris must not be overlooked. The cutting of the iris occasionally produces a hæmorrhage into the anterior chamber. Finally, capsular incarceration is much more frequent than in extraction of cataract without iridectomy.

2. *Suture of the cornea* (H. W. Williams, Suarez de Mendoza, Kalt, Vacher, Valude) is an operation difficult of execution. Most authors who have tried it consider that the advantages of the method are not proportionate to the difficulties presented by the operation.

3. *Conjunctival flap* (Desmarres, Pansier, Vacher) consists in terminating the section of the corneal flap by a tongue of conjunctiva, which forms a conjunctival bridge of about a centimeter in length. This conjunctival bridge inconveniences the extraction but little; but it is not of sufficient efficacy to resist a prolapse of the iris

4. *The conjunctival pouch* (Czermak, Dimmer), which one dissects near to the cornea and beneath which the crystalline lens is extracted, after the corneal section has been made with scissors, perhaps protects well from infection and prevents hernia of the iris. Nevertheless, to me it is an operative procedure which appears to require very delicate execution.

5. *The conjunctival purse suture* (Röhmer), which is made in the front of the cornea after the conjunctiva has been dissected all around the limbus, if it is useful against infection and hernia of the iris, constitutes in any case a considerable traumatism, and for several days forms a veil in front of the cornea which interferes with examination and hinders further procedure.

6. *The pedunculated conjunctival strip* (Kuhnt) drawn across the corneal

wound is a good protection from infection, but it plays no *rôle* against hernia of the iris. The author thinks this can be avoided by the almost linear sclero-corneal wound terminating in full corneal tissue.

Of all these modifications of the operation for cataract, added with a view to avoid infection of the wound, none has become popular, although their authors proposed them a great number of years ago. Of the procedures intended to prevent prolapse of the iris, the only one commonly employed is iridectomy. It is, however, a very radical method, that of taking off a part of the iris for fear that it may become extruded. Moreover, even after iridectomy incarceration is frequent. Iridectomy, then, is not a perfect method. It is consequently necessary to seek for an operative procedure which may be really efficacious, both against prolapse of the iris and infection. This is the result which I believe I obtain by my method of gliding or sliding of the conjunctiva.

Operative Procedure.

The eye should be rendered insensitive by cocaine, some drops of adrenalin being also instilled, in order that the dissection of the conjunctiva may provoke as little hæmorrhage as may be.

The speculum having been inserted, the operator places himself to the right of the patient in order to make the dissection of the conjunctiva. By means of forceps and blunt curved scissors, he detaches the conjunctiva corresponding to the upper half of the corneal limbus. This dissection stops below at the horizontal meridian of the cornea. The conjunctiva must be dissected from the sclerotic upwards to the extent of 8mm. to 10mm. Two silk sutures are then inserted, one on each side of the cornea. In placing the lower end of the thread, one introduces the needle beneath the conjunctiva, 2 mm. below the horizontal meridian of the cornea. The upper suture is passed beneath the detached conjunctival flap to a point about 10 mm. from the place of introduction of the lower end of the thread (Fig. 1). In a word, the sutures should be placed in such a manner that when they are tied after the extraction of the cataract, the detached conjunctival flap glides in front of the corneal wound and thereby covers about the upper fourth of cornea.

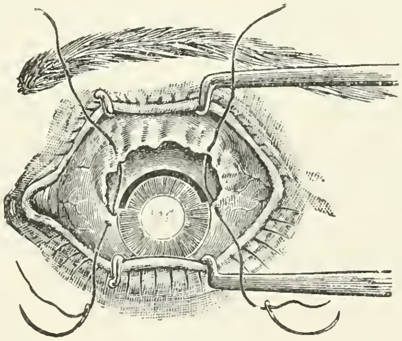

FIG. 1.

The cataract is then extracted according to the classic method: large corneal incision at the limbus, the section encroaching rather more upon the cornea than upon the sclerotic; discission; extraction of the crystalline;

reduction of the iris with the spatula. Personally, after having passed the sutures, I remove the speculum, then make the incision and remove the cataract, meanwhile fixing the eyeball by the superior rectus muscle, according to Angelucci's method. The two threads are next tied, the knots being placed on the two sides of the cornea. The conjunctiva then covers the upper fourth of the cornea (Fig. 2).

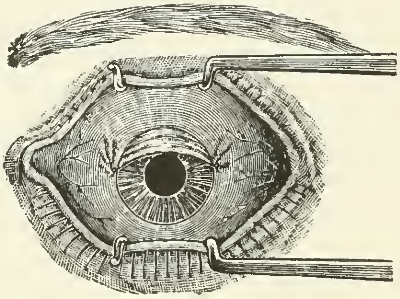

FIG. 2.

The threads are cut close to the knots, in order that they may not irritate the cornea. A drop of physostigmin oil is instilled, and a binocular bandage is then applied, and left in place for forty-eight hours. By that time the anterior chamber is re-formed, and a drop of atropin is instilled. After that, the bandage can be re-applied every day, but only to the eye operated upon, and atropine can be instilled, if it be thought necessary. There is often no need to disturb the sutures; they usually drop out about the fifth or sixth day, but if not, they may be removed.

The conjunctiva gradually retracts. Sometimes one finds that after forty-eight hours it has already receded from the cornea; at other times it continues to cover the cornea until the fourth or fifth day.

Advantages of the Procedure.

In the first place, the operation for cataract with the sliding flap is exceedingly easy of execution. It reduces itself to the classical simple extraction, to which is added the conjunctival dissection, which in ocular surgery is, of course, an elementary matter. Further, it protects against both prolapse of the iris and infection. In effect, by this procedure the edges of the wound are intimately applied to one another. The eyeball is thus fixed, so that the iris finds no point of exit. The conjunctiva has a tendency to retract; it exercises a pressure from before backwards, and consequently pushes the anterior lip of the wound against the posterior lip in a constant manner. The conjunctiva, drawn into place by sliding in front of the wound throughout its extent, acts as a real splint and assures a good coaptation to its lips, which is of primary importance for rapid cicatrization.

Nothing, to my view, proves better the efficacy of the procedure against prolapse of the iris than the following fact: in a case where the spatula failed to reduce the iris, the pupillary margin of which protruded in the wound, I noticed that the moment I tied the second knot, the iris took its normal position behind the cornea, and presented a perfectly round pupil.

As to the *rôle* which it plays against infection, the conjunctival flap covering all the wound, one knows that it is most efficacious. That is easily understood. The wound thus protected is shut off from the conjunctival sac—

a medium rich in microbes, a source of infection for the eyeball. The cicatrization can go on in an aseptic medium, and there is no fear of development of microbes in the interior of the eye, seeing that the well-sterilized instruments do not introduce any micro-organisms into it.

Even when the conjunctival flap retracts at the end of forty-eight hours, it has fulfilled its function. Thanks to the good co-aptation of the wound it has brought about, the cicatrization has become sufficiently firm and solid to prevent hernia of the iris, while the corneal epithelium has proliferated enough to form a barrier against infection.

Criticisms.

The method at once invites several criticisms, as under :—

Does not dissection of the conjunctiva lead to a nutritive disturbance of the cornea or to pronounced astigmatism ? Does it not provoke a troublesome hæmorrhage? Does it not prolong the operation? Do not the sutures give rise to ulceration of the cornea? Such are among a few of the many questions that may reasonably be asked respecting the operation.

The dissection of the conjunctiva does not entail any nutritive disturbances as regards the cornea. Kuhnt and Röhmer, who have practised very extensive dissections of the conjunctiva, mention no trophic disturbance of the cornea. It is obvious that for about a dozen days after operation, the eye will be more injected at the level of the conjunctival dissection than in an eye operated upon without a conjunctival flap. But this hyperæmia otherwise presents no drawback.

One need not fear that the dissection will give rise to hæmorrhage at the moment of operation, and in that way embarrass the surgeon when he is making the corneal section, the discission of the capsule, and the extraction of the cataract. Thanks to adrenaline, scarcely a drop of blood need be lost.

In order to dissect the conjunctiva and to pass the sutures, one or two minutes only are needed, and that is the extent to which the operation is prolonged. Is this an inconvenience? Not at all, since these operative steps take place before the eyeball is opened, and, indeed, before the cataract operation itself can be said to have commenced. Extraction combined with iridectomy, on the contrary, even if it be a little more rapid, presents the disadvantage of prolonging the perilous moments of the operation, since the iridectomy has to be made in the middle of the operation, after the limbus has been divided and before the cataract has been removed.

There is no necessity to fear any exaggeration of the corneal astigmatism after the operation. In fact, there is less than with the usual procedure.

When the sutures are cut close to the knots, one need not apprehend ulceration of the cornea. In any event, one looks at the eye daily, and if towards the third or fourth day there be any reason for suspecting such an accident, there would be no objection to taking out the sutures immediately.

Conclusion.

My method should not be regarded as an exceptional one, applicable only to difficult cases or to cases where it is desired to dispense with a bandage. It should be employed as a routine method. In this way we shall still further reduce the complications, immediate and remote, that are unhappily still so common in cataract extraction. The method has been adopted by Dr. Webster Fox,* who writes :—" The sliding flap of conjunctiva

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(The two figures used to illustrate Dr. van Lint's communication have been taken from *Ophthalmology*, January, 1912.)

in simple cataract operations has given me great satisfaction in thirty operations, and the splendid results obtained in these cases induce me to make public this brief report on the method." He further adds :—" I may remark that many ophthalmic surgeons who have visited my clinic and witnessed this operation have been much impressed with its practicability, and several have reported to me that they have practised it with much success since returning to their homes."

In conclusion, allow me to say that I am persuaded that you will have equally satisfactory results if you will do me the honour to try the method.

CLINICAL MEMORANDUM.

A CASE OF PARINAUD'S CONJUNCTIVITIS DUE TO ANIMAL INFECTION.

BY
P. H. ADAMS, M.B., D.O., Oxon, F.R.C.S.
OXFORD, ENGLAND.

PARINAUD[1] in the original description of this form of conjunctivitis surmised that the condition might be due to infection from animals. Gifford,[2] some years later, was doubtful as to the correctness of this observation. Next, Doyne[3] independently described a form of conjunctivitis, which he ascribed to mangy dogs or cats, calling it "septic conjunctivitis," and which he afterwards identified with Parinaud's conjunctivitis.

The present case proves beyond doubt that the condition can be caused by animal infection :

The patient, a strong healthy boy, aged seven years, was brought to me by Dr. M. C. Hayward, of Abingdon, on 7th November, 1911. There was a history of the left eye having been swollen for a week, and a lump had appeared in front of his left ear the day before I saw him. At that time there was marked enlargement of the follicles of the conjunctiva of the lower lid, with some also at the angles of the upper lids. There was puffiness and fulness of the lower lid, slight ptosis of the upper lid, and a considerable degree of œdema of the ocular conjunctiva. The preauricular gland of that side was much enlarged and tender.

I at once inquired as to whether the boy had much to do with dogs or cats, and found that he was always playing with a dog, whose eyes had been noticed to be "messy." I got Dr. A. G. Gibson, the University Demonstrator of Pathology, to make a bacteriological examination, and he found an organism, morphologically identical with Friedländer's pneumo-bacillus, present on the conjunctiva in pure culture. He also examined the conjunctiva of the dog, and found the same organism present there.

The case pursued its normal course. The boy was in bed for a week, having a temperature of 102°-103° F. There was much swelling of the preauricular, sub-maxillary, and cervical glands. At the end of a week the temperature fell to normal and the glands, with the exception of the preauricular, subsided.

The conjunctival condition remained about the same. At the end of February there was a small sloughy ulcer present near the external canthus, with granulations round it, and œdema of the ocular conjunctiva persisted, especially on the outer side.

In the middle of March, about four months from the start, I had to open the preauricular gland and found it full of yellowish necrotic material. Culture proved sterile, but the same organism as before was present in smears of the discharge. After this, the eye condition rapidly quieted down, and by the middle of April, the follicles had almost gone, but the ocular conjunctiva had still a gelatinous look and was of a yellowish-brown colour. The opened gland did not finally close until June.

As regards treatment of the case.—It was started with argyrol and perchloride lotion, with no effect at all. A vaccine was made from cultivations of the organism and several doses were given, but apparently with no effect, although a slight local reaction was obtained. The drug that appeared to have the best influence on the disease was methylene blue, 3% solution, unfiltered, and rubbed into the lids with wool on a glass rod. This was tried at the suggestion of Professor George Dreyer, the University Professor of Pathology.

Silver nitrate, copper sulphate, and zinc sulphate were also tried, with no appreciable benefit.

As regards the bacteriology, numerous organisms have been found in the reported cases of Parinaud's conjunctivitis, but I can trace no record of Friedländer's pneumo-bacillus having been found. Under the circumstances, it suggests that this is a disease not caused by any specific organism, but rather a lymphadenitis of the conjunctiva, which may be caused by any organism if inoculated in the right region, which might easily be done by a prick from the hair of an animal.

In connection with this theory, Goldzieher[4] described a similar condition, which he called "lymphadenitis conjunctivæ," seven years before Parinaud's communication, although he did not believe in the animal origin of the condition.

REFERENCES.

1. **Parinaud.**—*Bull. de la Société d'Ophtal. de Paris*, 5 février, 1889.
2. **Gifford.**—*American Journal of Ophthalmology*, July, 1898.
3. **Doyne.**—*Lancet*, 7th November, 1903.
4. **Goldzieher.**—*Centralbl. f. prak. Augenheilkunde*, Januar, 1905.

NOVELTIES.

A BUTTON IRIS-REPOSITOR.

BY

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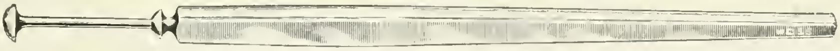
WOLVERHAMPTON, ENGLAND.

It is unnecessary to point out the advantage of introducing into the wound as few instruments as possible, and in the operations which necessitate replacement of the iris probably most surgeons avoid, when possible, using the ordinary repositor by the method of introducing that instrument through the wound and bringing it into direct contact with the iris. Most, doubtless, prefer rather to stroke the iris into place with the flat of the repositor applied directly to the overlying corneal surface. This manœuvre is successful in a number of cases, but in many, in my experience, it fails. I have therefore had made for me by Messrs. Weiss & Son, of London, the small instrument, a sketch of which accompanies this note. The working end is hemispherical, and measures 5 mm. in diameter.



My excuse for bringing forward an addition to the formidable array of instruments already on the market is the unexpectedly successful manner in which it smoothes the iris into place when applied over the limbus and cornea, especially in the Lagrange operation of sclerectomy, with or without a peripheral iridectomy.

A DROP BOTTLE FOR USE IN EYE WORK.*

BY

ARTHUR J. BALLANTYNE, M.D.

SURGEON TO THE EYE INFIRMARY, GLASGOW, SCOTLAND.

THE drop bottle here illustrated has been designed as a substitute for the Chalk bottles and others in common use, and can be employed under the same circumstances, in the consulting room, in the operating theatre, and in the dispensing of drops for patients' own use.

It consists of a glass tube, $\frac{1}{2}$ inch in diameter and $3\frac{1}{2}$ inches long, closed at one end and at the other drawn out into a horizontal beak or nozzle terminating in a small opening. In the back of the tube there is a round opening, about $\frac{3}{8}$ inch in diameter. The solution is poured into the tube through this opening, and a short length of black rubber tubing of $\frac{5}{16}$ inch bore is then slipped on, so as to cover the opening. The position of this is indicated by the dotted line in Fig. 1. If the tube is held as in Fig 2., light pressure on the rubber diaphragm will expel a single drop. The pressure is then removed, and this can be repeated as often as necessary. The bottle should not be filled above the lower lip of the opening. It is thus unnecessary for the solution to come into contact with the rubber. Fifty minims is a suitable quantity for this size of bottle.

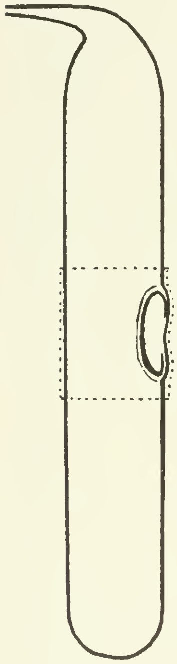


Fig. 1.

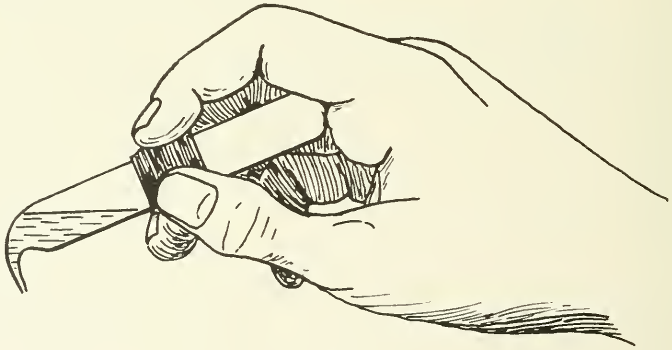


Fig. 2.

The bottle can be sterilised by moist or dry heat, and the rubber by soaking in weak carbolic or other antiseptic and rinsing in sterile water before slipping it on to the bottle. I have found it convenient to make up the solution in a small boiling tube ($\frac{7}{8}$ inch diam. and $2\frac{1}{2}$ inches long) provided with a lip, which can be held over a spirit flame by means of a test-tube clip. The lip is an advantage when pouring the solution into the drop bottle. One boiling tube is kept for each solution, and these also can be put in the steriliser before use.

The following are some of the advantages claimed for this drop bottle :—

(1) It is easily sterilised, and presents the minimum of surface on which dust can lodge. The solutions keep free from deposit and fungus much longer than in the ordinary types of drop bottle.

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* Exhibited at the Oxford Ophthalmological Congress, July 18th and 19th, 1912.

(2) It is simple in construction and combines bottle and pipette in one. Spilling is avoided.

(3) Solutions can be used either hot or cold, and cold solutions can be rapidly warmed if desired.

(4) It can be used with very small quantities of solutions, and every drop can be used.

(5) It is cheaper than the Chalk bottles and most forms in common use.

The bottles have been made for me by Messrs. Thomson, Skinner, and Hamilton, 38, Sauchiehall Street, Glasgow, who have also supplied the boiling tubes for making up the solutions. Messrs. John Weiss & Son, London, have made a small metal case in which a single bottle can be carried to operations, etc., and also a metal stand, to hold a set of six bottles under a glass shade, for the consulting room.

REVIEW.

SALVARSAN IN DISEASES OF THE EYE.*

BY

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LONDON, ENGLAND.

LITTLE more than two years have elapsed since the announcement of Professor Ehrlich's momentous discovery of "606,"[1] yet that product has now been tried in almost every conceivable form of syphilitic disease of the eye.

Apart from the interest attaching to any remedy described as *therapia magna sterilisans*, ophthalmic surgeons were led to employ the novel agent with the less fear since it was early shown that "606" exerted no such pernicious effect upon the eye as was known to follow the administration of some other forms of organic arsenic, in particular atoxyl. This freedom from danger was explained by Ehrlich by the circumstance that the arsenic of "606" was in a molecular combination different from that of atoxyl. After the discoverer had distributed his product among those who were in a position to employ it to the fullest advantage, and there had been time to experiment with it, it was shown at a medical meeting at Königsberg, held in September, 1910, that "606" had no harmful result upon the eye. Then, and not until then, the remedy was placed in the hands of a firm of German chemists, which in December, 1910, marketed the product under its present proprietary name of "Salvarsan."

As most people know, the employment of Salvarsan has not been restricted to syphilitic affections of the eye, pure and simple. It has also been used in a number of other conditions, chief among which is sympathetic ophthalmitis (Siegrist, Flemming, Fleischer, de Ridder). In the present communication, however, syphilitic diseases of the eye alone will occupy our attention.

It seems almost superfluous at this juncture to consider the best means of administering Salvarsan, although from a practical point of view the question is a vital one. Suffice it to say that the earlier predictions as to the inadvisability of giving it by intra-venous injection have been signally falsified in the light afforded by more extended experience. To-day the balance of opinion is strongly in favour of introducing the remedy into the system by means of the veins.

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* Introduction to a Discussion on Salvarsan read at the Annual Meeting of the British Medical Association in the Section of Ophthalmology, July 26th, 1912.

As to dosage, it is now universally recognized that treatment should be directed not so much to the mere alleviation of this or that symptom as to the cure of the underlying disorder, a principle that applies just as much in syphilitic diseases of the eye as in those of any other part of the body. At least two or three *maximum* doses should be administered at intervals of a few days or weeks. Oscar Fehr[2], explains the absence of strikingly good results in eye work by the insufficient doses of Salvarsan so often administered, more especially in the earlier cases. Indeed, some good authorities, as McIntosh and Fildes[3], hold that inadequate dosage may result in the production of resistant strains of spirochætes, and in that way is calculated to do more harm than good.

It is clear that the employment of Salvarsan should go hand in hand with frequent determinations of the Wassermann reaction. The one is the complement of the other. A positive Wassermann, of course, indicates the necessity of further treatment by Salvarsan or by mercury. On the contrary, cure must be assumed when negative serum reactions are obtained for a year after the cessation of treatment, such estimations being made at intervals of six weeks or two months. McIntosh and Fildes[4] insist that the Wassermann reaction, as usually carried out qualitatively, has relatively little value in controlling treatment by "606" or mercury. In their view, quantitative estimations should be substituted for the others.

It is now recognized that the scientists' dream of *therapia magna sterilisans* can seldom be realized by the administration of a single injection, no matter how large. The only exception appears to be in very early cases—that is to say, when the spirochætes have not as yet invaded all parts of the patient's system. There is a difference of opinion as to whether mercury should be given in addition to Salvarsan. The argument for the combined method is found in the fact that while Salvarsan destroys all the spirochætes it can reach, mercury destroys the remainder by a slower process, or, as some believe, renders the organisms more accessible to the action of arseno-benzol.

That Salvarsan, even when administered in adequate doses, does not of necessity prevent the subsequent appearance of syphilitic disease of the eye, is attested by the cases of Cohn, Antonelli, Westhoff, Chronis, and others. In Cohn's[5] case, acute inflammation of the iris developed six or seven weeks after Salvarsan had been injected for the cure of a syphilitic eruption on the skin. In the case related by Westhoff[6] the remedy, injected on account of unilateral optic neuritis, failed to prevent slight neuritis from developing in the second, hitherto unaffected, eye. These untoward results (there would be no difficulty in quoting more) are to be explained in the same way as relapses after Salvarsan, namely, that while the remedy has sterilized most of the spirochætes disseminated through the patient's system, it has failed to reach nests, as it were, lodged in poorly vascularized or anatomically sheltered regions. This view is borne out by Ehrlich's observation, which is to the effect that cases of the kind can almost always be cured by further injections of Salvarsan or by the administration of mercurials. It other words, it is thought that the conditions in question are the result not of the remedy but of the original disease.

A similar explanation applies to the rare development (0·8 per cent., Benario) from one to three months after injection, of paralytic affections of the ocular muscles or of optic neuritis or of neuro-retinitis. It must be admitted, as pointed out by Bénario, Gèronne, and Gutmann, that these early nervous complications have become much commoner since Salvarsan came into vogue as a remedy for syphilis. According to Benario[7], 94·1 per cent. of these accidents are met with in the earlier secondary stages; that is, at a time when the spirochætes are most widely distributed throughout the system. We are, therefore, faced by a new element related in some as yet unknown way to the employment of Salvarsan (Goerlitz). There may be truth in the suggestion put forth by Haike and Wechselmann, namely, that the inadequate amount of Salvarsan likely to reach the sheltered nerves of the cranial cavity may stimulate the spirochætes, and thus account for the greater frequency of paralytic accidents observed since the introduction of Salvarsan. Somehow or other, explain it as we will, the new remedy seems to have led to a change in the type of syphilis, so that lesions, once regarded as tertiary or quaternary manifestations, now appear comparatively early in the course of the disease.

As pointed out by Benario and Fehr respectively, further arguments telling against the toxic origin of these conditions are to be found in the several facts: (1) the long interval that usually separates the injection and the *Neurorezidiv*; (2) the greater liability to these accidents after small than large doses of Salvarsan. (3) the fact that they have not been met with in non-syphilitic patients treated with Salvarsan; and (4) the circumstance that optic neuritis is seldom seen in poisoning with organic arsenic, while a case of paralysis of the eye muscles under those circumstances has yet to be recorded (Uhthoff).

In brief, such examination of the evidence as I have been able to make, leaves little doubt in my mind that these various accidents are essentially of a syphilitic nature, or "*Neurorezidive*," as the German word for them indeed implies.

At the last Heidelberg Congress[8] there appeared to be a widely-spread feeling among the members that relapses were the rule unless treatment with Salvarsan was combined with treatment with mercury and potassium iodide. The supposition, for reasons already explained, is quite reasonable; but a still more important and tangible factor is to be found in the method of administration. This is one of the strongest arguments in favour of the intra-venous injection of Salvarsan, inasmuch as relapses, known to occur in from 20 per cent. (Treupel and Levi) to 48 per cent. (Merschalko) of the cases treated by the subcutaneous or intra-muscular injection of the remedy, are generally admitted to be very rare after intra-venous medication, especially if more than one injection has been given. For example, Spiethoff[9] had eight relapses among two hundred patients treated to begin with by intra-muscular injection, but none among the same number after injection of the remedy into the veins. McIntosh and Fildes[10], again, observed no relapses during three to six months' observation of patients treated by two intra-venous injections alone or by a like number combined with one intra-muscular injection. These authors conclude "that intra-muscular and subcutaneous methods of application are practically useless in obtaining a permanent effect" (p. 209).

All authorities now recognize the importance of preparing the patient properly before Salvarsan is injected. He should be treated much as though he were about to undergo a major operation, together with the administration of a general anæsthetic. He should be in bed, and should remain recumbent for several hours after the injection. Under no circumstances should the so-called "ambulatory" method be adopted with Salvarsan.

The general symptoms so commonly seen after the intra-venous injection of Salvarsan, such as pyrexia, shivering, sweating, nausea, headache, restlessness, insomnia, and so forth, have, of course, been observed after its use in eye affections. As a rule, however, they have been so slight as to be quite unimportant. For that matter, many patients experience no ill-effects whatever, especially, in my experience, if the injection be made into the muscles. Some recent work by McIntosh, Fildes, and Dearden[11] goes to show that all the ill-effects of an intra-venous injection are due not to the "606" but to the saline used in its preparation. When the saline is made from *freshly* distilled water, the injections appear to be entirely deprived of toxic effect.

As regards the eye, we have to enquire whether there are any points, apart from the generally recognized contra-indications, that should make us chary of injecting Salvarsan. In the first place, it is clear that a local reaction must, if possible, be avoided, since such might damage the delicate tissues of the eye. The Jarisch-Herxheimer reaction, as it is called, may occur after the injection of any dose of Salvarsan, but it is believed to be commoner when an insufficient dose has been employed (McIntosh and Fildes).

Krückmann[12] has constituted himself a somewhat austere critic of Salvarsan in the treatment of eye cases. To Salvarsan he traced the appearance of multiple small retinal hæmorrhages; but, as pointed out by Wagenmann and Gutmann, such have been known to follow the administration of mercury alone. R. Granville Waddy[13] states that Salvarsan is contra-indicated in severe vascular lesions of the eye, with a tendency to hæmorrhage. In support of that view, he reports the case of an elderly female, suffering from a thrombotic condition of the retinal veins, who was subjected to treatment by arseno-benzol, and who developed a hæmorrhage into the vitreous of the affected eye in the course of four to six weeks after the injection.

To us as ophthalmic surgeons it is of the first importance to know what action Salvarsan has upon the optic nerve. It has been very generally held that the remedy should be avoided in cases where there was any evidence of optic neuritis or atrophy, and to judge from the literature at my disposal, this dictum has been widely accepted. The fact is the more curious since early in the history of "606," among upwards of 25,000 patients treated with the new remedy, Ehrlich was able to find one only, a case reported by Finger[14], where the optic nerve was alleged to have been damaged by the agent. In that case treatment had been carried out with other arsenical compounds, as enesol and atoxyl, so that it was by no means conclusive. Wechselmann[15], again, treated upwards of 1,200 patients with Salvarsan without observing an instance of amaurosis.

The experimental evidence furnished by Igersheimer[16] does not seem to me to tell strongly in either direction, for it simply proves that Salvarsan, while non-toxic in rabbits and dogs, is toxic in cats. Briefly, he injected Salvarsan into nine rabbits, five cats, and one dog. In the rabbits and the dog he failed to detect any ophthalmoscopic or microscopic changes in retina or optic nerve, such as may follow the injection of arsenic, although that metal was demonstrable in the hinder segment of the animals' eyes. Cats, on the contrary, presented degeneration of the retina and optic nerve, together with other signs of poisoning, such as shedding of the hair.

When we come to clinical cases, however, we obtain much evidence that Salvarsan does no mischief to the optic nerve, normal or diseased. Upon this point Wechselmann[17] speaks with no uncertain voice. He treated successfully three cases of syphilitic optic neuritis with Salvarsan, while in eight patients almost blinded by advanced optic atrophy, not one became worse under the injections. In three recent cases of optic atrophy Wechselmann obtained encouraging results. Although he does not affirm that Salvarsan is a remedy for optic atrophy, yet he says[18]:—"At least it seems to be demonstrated that in cases where an injection is desirable, it may be administered without fearing that the diseased optic nerve will be detrimentally affected."

de Lapersonne and Lévi[19] comment upon the remarkable, though transitory, improvement obtained by them with Salvarsan in cases of optic neuritis. Stuelp,[20] as the result of a collective investigation, found that among 76 cases of syphilitic disease of the retina and optic nerve, a rapid or good result had been obtained with Salvarsan in 63 per cent. In a case of choked disc, reported by Flemming[21] from Greeff's *klinik*, the optic disc became normal a couple of weeks after the injection of arseno-benzol. Dolganoff[22] examined three hundred patients with healthy eyes one or two months after the injection of Salvarsan, and discovered no departure from the normal in a single instance. Even where the remedy appeared to be contra-indicated on account of some pathological condition of the optic disc, Dolganoff found that the administration of Salvarsan had done no harm. Bistis[23] maintains that arseno-benzol is not contra-indicated in the presence of optic lesions, whether of metasyphilitic nature or caused directly by the syphilitic virus. Lacapère[24] obtained encouraging results in a couple of patients suffering from tabetic atrophy from the intra-venous administration of Salvarsan. The injections, which were given in series, although they did not cure the disease, appeared to prevent its further progress. Lacapère believes that so far as the eyes are concerned, Salvarsan is a perfectly harmless remedy.

G. A. Gorbunow[26], treated four cases of tabetic atrophy with Salvarsan not only without harm, but with positive benefit. On one occasion the improvement can only be described as surprising.—The patient, a man aged 33 years, some seven years after the primary sclerosis, was in a deplorable state both as regards his sight and his general condition. He was unable to see a gas-flame. After two injections of Salvarsan, he was able to count fingers, and to recognize large objects. The retinal arteries, which were formerly almost completely obliterated, had become of good size, and the optic discs had regained some of their natural colour. The patient, who was bed-ridden before the injections, was able to stand up. After two further injections, matters improved still more. Thus, he regained power over his bladder, previously paralysed ; his muscular sense became practically normal ; and he could walk. His sight was good enough to distinguish the size and position of photographs hanging on the walls of a strange room. One optic disc could no longer be described as atrophic, and the other showed considerable objective improvement. Six weeks after the last injection, however, the Wassermann reaction was still distinctly positive.

Lastly, Fehr[25] treated thirty-one cases of syphilitic optic neuritis, or choked disc, with Salvarsan. In nine of these the condition cleared up ; in seventeen there was considerable improvement ; and in five no influence was observed.

In opposition to the weighty evidence just quoted, we find Krückmann[27], who relates the following somewhat inconclusive case in support of his opinion.—A man, aged 24 years, infected four years previously with syphilis, presented evidences of incipient tabes, including a suspicious pallor of the optic discs. But sight was normal, and there were neither colour nor field defects. Contrary to advice, an intra-muscular injection of Salvarsan was made. Six weeks later, when the patient was again seen by Krückmann, both optic nerves were found to be distinctly atrophic, and sight was reduced to hand movements in the left eye and to 1/20 in the right eye. The visual fields were markedly reduced, and the colour sense had disappeared from one eye, while in the other the red-green sense was destroyed. There had been no consentaneous increase in the tabetic symptoms. Krückmann's case, to my mind, simply shows that Salvarsan failed to stop the progress of an incipient tabetic optic atrophy. It does not prove, as the author appears to suppose, that Salvarsan exerted a bad effect upon the optic nerves.

Under the question-begging title of *A case of Optic Atrophy from* '606' McNeil, Robb and Moll[28] report an instance of atrophy after the use of Salvarsan. For the cure of a primary sore, 0.6 gramme of Salvarsan was injected into the muscles on February 13th, and the local sores were completely healed within a fortnight. The patient was placed upon small doses of mercury with chalk. When seen in March he complained of neuralgic pains over the right brow. On April 10th he said he was blind in the right eye, and that his left eye was weak. The pain over his right brow was severe. A diagnosis of optic atrophy in the right eye was made, although nothing definitely amiss with the left eye could be found. Details of the condition of the eyes, however, are conspicuous by their absence, but the condition was probably one of retro-ocular neuritis. In assuming that it was caused by Salvarsan the authors seem to me to have confused the *post* with the *propter hoc*. It is about as conclusive as claiming that the eye disease was due to the mercury used in the case.

That the use of Salvarsan is contra-indicated in spinal atrophy of the optic nerve was repeated only the other day by Robert G. Reese,[28a] of New York City. Dr. Reese stated that in such cases "the administration of Salvarsan has apparently hastened the inevitable end." In support of this assertion, he reported (very incompletely) the case of a man affected with tabetic atrophy of both optic nerves, of three years duration. Six weeks after the injection of Salvarsan, according to the patient's statement, sight was suddenly lost. In all seriousness, can this case be held to justify the author's conclusion? The answer to that question must, I think, be in the negative. In my opinion, it merely goes to show that tabetic optic atrophy pursues no uniform course. As we all know, some of the cases progress rapidly to blindness, while others remain stationary for many years. I have under observation at the present moment a lady, aged 68 years, who can still walk unaccompanied in the streets of London, and whose optic discs have been pallid, to my knowledge, for nineteen years. Moreover, the course of tabetic optic atrophy may progress in jerks, as it were, and that is probably the explanation of Dr. Reese's unfortunate experience.

In sum, an examination of the evidence seems to show that Ehrlich was right when he affirmed, nearly two years ago, that Salvarsan had no injurious effect as regards the optic nerve.

When we pass to consider, as briefly as may be, certain individual syphilitic diseases of the eye, we find no unamimity of opinion as to the curative effect of the new product. That is in itself sufficient to show that in Salvarsan modern chemical science has not yet provided us with an actual specific in eye disease, whatever may be the case in other parts of the body. At most, it has endowed us with one more anti-syphilitic remedy, the exact place of which remains as yet somewhat uncertain.

As an example, take the keratitis of inherited syphilis, against which the ordinary remedies are well-nigh impotent. The futility of mercurial treatment in such cases has been the subject of recent comment by Fromaget.[29] Who, indeed, has not seen the second eye become involved when the patient was under full treatment for keratitis in the other eye? A similar event has been witnessed in patients treated with Salvarsan by Wechselmann, Best, Bloch, v. Grosz, Engelmann, Seligsohn, Waddy, Fehr, and others. Now here, if anywhere in the eye, is an affection likely to be signally benefited by Salvarsan, more especially as the results obtained from another arsenical compound, Atoxyl, are known to be good, although liable to be purchased at too high a price. But what are the facts? A few surgeons report good results, while the majority appear to think that the malady is little influenced by Salvarsan.

The best results were obtained by Seidel,[30] who employed intra-venous injections (2) and subcutaneous injection (1) in the same subject. Mercury was not used. Seidel reported ten out of twelve cases, or 83 per cent., as definitely benefited. Seidel regards Salvarsan as superior to mercury and as a specific in the disease. Igersheimer[31] in 23 cases found that a single injection never influenced the disease favourably. A second injection sometimes relieved photophobia, but seldom improved the corneal changes. But recently, influenced by the example set by Seidel, he has given three injections of Salvarsan at intervals of a week, and by that method has obtained a good result in three of five cases. Somewhat similar experiences have fallen to Schnaudigel's[32] lot. The cases, which responded neither to inunction nor to the injection of 0·5 gr. of Salvarsan, improved rapidly after a second injection of the same amount. de Schweinitz[33], also, had gratifying results in two of three patients treated with two to four injections, but mercury or potassium iodide was also administered. In view of these facts it is not surprising that Fehr[34] obtained better results in his later cases of interstitial keratitis, treated with repeated injections, than in his earlier cases, treated with a single injection.

On the other hand, among one hundred and eleven cases of syphilitic disease of the cornea collected by Stuelp[35], Salvarsan yielded a good result in only 28 per cent. This result seems the more disappointing, since Igersheimer and Hata found that Salvarsan acted successfully in syphilitic keratitis experimentally induced in rabbits. But, then, Stuelp's figures date from a time when the single dose treatment was in vogue.

My personal experience has been limited, but so far as it goes, it confirms the observations of Lindenmeyer[36] and Denig[37] namely, that while Salvarsan often causes a rapid improvement in such symptoms as photophobia and redness of the eye, it has no greater influence in clearing the cornea than the remedies in everyday use. At the same time, as I have not until recently employed more than a single injection, my results in the light of present-day knowledge cannot be expected to carry any great weight, and that I do not attempt to claim for them.

The cornea is an avascular structure ; and if interstitial keratitis be due to the deposit of spirochætes in its substance, as appears to be proved by the recent investigations of Igersheimer[38] and Clausen,[39] we have some kind of working explanation of the fact that one injection of Salvarsan seldom effects much good in these cases.

In a single case of interstitial keratitis due to acquired syphilis, the cornea speedily regained its transparency under treatment by Salvarsan ; but, then, so it would doubtless have done under mercury to judge from my experience of the disease. Cases of the kind have been reported by Manzutto, Becker, Igersheimer, and Fehr.

Now to turn for a moment to an affection that responds, as a rule, well to mercury, namely, the irido-cyclitis of secondary syphilis, we find an almost unanimous opinion that Salvarsan acts as well as and much more speedily than mercury. Stuelp collected ninety-nine cases of affections of the uveal tract treated with Salvarsan, and found that a good result was obtained in 63 per cent. The percentage doubtless would be higher still if cases of syphilitic irido-cyclitis alone were included in the figures. The rapidity of action of Salvarsan is very striking. For example, F. Schanz[40] mentioned a case of severe syphilitic iritis, one year after infection, cured in one week by Salvarsan. Again, Becker[41] noted in several cases that the violent pains of the disease were better on the night of the injection, and that they had disappeared completely on the next day. A remarkable case is mentioned by Seidel,[42] where, thirty hours after injection, the eye was found to have almost lost its redness, while sight had risen from fingers at 2 to 3 metres to 5/4. Lastly, Fehr[43] obtained a rapid cure in thirteen cases treated with arseno-benzol. An improvement was usually noticed on the day following the injection. Relapses were not met with. In four of the cases cure was complete within one week, in six within fourteen days, and in two after three weeks.

Whether Ehrlich's very latest product, "Neo-Salvarsan" or "914," a neutral and exceedingly soluble derivative of arseno-benzol, will give better results in eye work than the older preparation, remains to be seen. No reports as to its efficacy in that direction are as yet forthcoming. The convenience of "Neo-Salvarsan" is great, since so simple is the process of preparation that the solution may be prepared extemporaneously at the bedside of the patient. "Neo-Salvarsan" is stated by E. Schreiber[44] (a pioneer in the employment of Salvarsan) to be less toxic than, and just as efficacious as, its predecessor. According to experiments reported only the other day by McIntosh, Fildes, and Parker,[45] it possesses from five to ten times the parasiticidal power of Salvarsan.

The gist of the whole matter appears to me to be that, when properly given, Salvarsan presents no particular danger either as regards the body in general or the eye in particular. It has proved itself to be well-nigh a specific remedy in primary and secondary syphilis, and, furthermore, to act speedily and satisfactorily in some diseases of the eye, particularly in those of the uveal tract. There is no reason, therefore, why its employment in ocular maladies should not be extended and multiplied. Recent experience shows that it is best given by injection into the veins, and that the former one-time injection of small doses is not so efficacious as a series of from two to four injections, each of a maximal dose. In order that the action of one remedy may be supported and reinforced by that of another, Ehrlich's principle of so-called "combined therapy" should be adopted in diseases of the eye. In other words, each intra-venous injection of Salvarsan should be followed by a series of mercurial inunctions, the whole process extending over a period of from six to twelve weeks. The serum reaction should throughout remain our touchstone as to the efficacy of treatment and the permanance of cure. The continued absence of clinical manifestations has, it would seem, less value.

REFERENCES.

1. *Münch. med. Wochenschrift*, 15 März, 1910.
2. **Fehr, Oscar.**—*Centralbl. f. prak. Augenheilkunde*, Juni, 1912.
3. **McIntosh and Fildes.**—*Syphilis from the Modern Standpoint*, 1911, p. 185.
4. **McIntosh and Fildes.**—*Ibidem*, p. 163.
5. **Cohn.**—*Wochenschrift f. Ther. u. Hygiene des Auges*, 6 Oktober, 1910.
6. **Westhoff.**—*Ibidem*, 25 Mai, 1911.
7. **Benario.**—*Zeitschrift f. Chemotherapie*, 1912.
8. *Bericht der Ophthal. Gesellschaft*, Heidelberg, 1911, S. 82.
9. **Spiethoff.**—*Münch. med. Wochenschr.*, 1911, No. 58.
10. **McIntosh and Fildes.**—*Syphilis from the Modern Standpoint*, p. 215.
11. **McIntosh, Fildes, and Dearden.**—*Ibidem*, p. 207.
12. **Krückmann.**—*Bericht der Ophthal. Ges.*, Heidelberg, 1911, S. 84.
13. **Waddy, R. Granville.**—*Oxford Thesis*, 1912.
14. **Finger.**—*Wein. med. Wochenschrift*, 1910, No. 4, S. 326.
15. **Wechselmann.**—*The Treatment of Syphilis with Salvarsan*, 1912, p. 43.
16. **Igersheimer.**—*Bericht der Ophth. Ges.*, 1911, S. 65.
17. **Wechselmann.**—*The Treatment of Syphilis with Salvarsan*, 1912, p. 42.
18. **Wechselmann.**—*Ibidem*, p. 47.
19. **de Lapersonne and Lévi.**—*Arch. d'Ophtal.*, janvier, 1911.
20. **Stuelp.**—*Woch. f. Ther. u. Hygiene des Auges*, Februar 23, 1911.
21. **Flemming.**—*Arch. f. Augenheilkunde*, Bd. LXVIII, 1911.
22. **Dolganoff.**—*Berl. klin. Wochenschr.*, 6 November, 1911.
23. **Bistis.**—*Arch. d'Ophtal.*, août, 1911.
24. **Lacapère.**—*Gaz. des Hôpitaux*, 25 janvier, 1912.

25. **Fehr.**—*Centralbl. f. prak. Augenheilkunde*, Juni, 1912.
26. **Gorbunow, G. A.**—*Centralbl. f. prak. Augenheilkunde*, März, 1912.
27. **Krückmann.**—*Bericht der Ophth. Ges.*, Heidelberg, 1911, S. 84.
28. **McNeil, Robb, and Moll.**—*Transvaal Medical Journal*, May, 1912.
28A. **Reese, Robert G.**—*New York State Journal of Medicine*, July, 1912.
29. **Fromaget.**—*Annales d'Oculistique*, octobre, 1910.
30. **Seidel.**—*Bericht der Ophth. Ges.*, 1911, S. 82.
31. **Igersheimer.**—*Bericht der Ophth. Ges.*, 1911, S. 65.
32. **Schnaudigel.**—*Arch. f. Augenheilk.*, Bd. LXVIII, S. 212.
33. **de Schweinitz.**—*Therapeutic Gazette*, May 15th, 1912.
34. **Fehr.**—*Centralbl. f. prak. Augenheilkunde*, Juni, 1912.
35. **Stuelp.**—*Klin. Monatsbl. f. Augenheilkunde*, 1911, Bd. XLIX, S. 369.
36. **Lindenmeyer.**—*Münch. med. Woch.*, No. 43, 1910.
37. **Denig.**—*Ophthalmic Record*, December, 1910.
38. **Igersheimer.**—*Deutsche med. Woch.*, No. 20, 1910.
39. **Clausen.**—*Klin. Monatsbl. f. Augenheilk.*, 1911, Bd. XLIX, S. 105.
40. **Schanz, F.**—*Münch. med. Wochenschrift*, 8 November, 1910.
41. **Becker.**—*Bericht der Ophth. Ges.*, 1911, S. 75.
42. **Seidel.**—*Ibidem*, S. 82.
43. **Fehr.**—*Centralbl. f. prak. Augenheilkunde*, Juni, 1912.
44. **Schreiber, F.**—*Münch. med. Woch.*, 23 April, 1912.
45. **McIntosh, Fildes, and Parker.**—*Lancet*, 13th July, 1912.

TRANSLATION.

8.—GUIDE TO THE MICROSCOPIC EXAMINATION OF THE EYE.

(*Continued.*)

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They are transferred to a $\frac{1}{2}$-1 per cent. solution of hydrochloric acid.

They are then washed.

The examination is made in water, alcohol, or glycerine.

Oil. Canada balsam.

Tissues which have been kept in Müller's fluid for long periods, since they are more difficult to stain, are treated by von Hippel as follows:—

The sections are placed for 12-18 hours in a mixture of equal parts of a 10 per cent. solution of ferro-cyanide of potassium and chemically pure hydrochloric acid, which is well diluted with distilled water.

They are then carefully washed in tap-water. Berlin blue is dissolved slowly by distilled water.

The section can now be stained with alum-carmine.

They are dehydrated, cleared in oil, and mounted in Canada balsam.

Pigment containing iron is stained a fine blue colour by this method, and the reaction is so exact that mistakes cannot arise. Iron instruments must not be employed. The normal pigment of the eye, even when it is displaced as in retinitis pigmentosa, does not give the reaction. The siderosis is most apparent in certain groups of cells, *viz.*, in the epithelium covering the ciliary processes (the pars ciliaris retinæ), in the retina, and in the epithelium under the lens capsule.

After intraocular hæmorrhages the retinal pigment epithelium under certain circumstances takes up iron which has resulted from the disintegration of hæmogoblin (von Hippel); and *Leber* states that it is possible in this way to distinguish between cells derived from the pigment epithelium, and those derived from the pigmented cells of the choroidal stroma. Thus when hæmorrhages have occurred in an eye affected with a tumour of the choroid, the pigment epithelium and its derivatives in the detached retina and pars ciliaris are found to contain a very large amount of iron derived from hæmoglobin. The stroma cells do not take up iron under these circumstances, and consequently do not give Perls' reaction.

2. *Quincke's Sulphide of Ammonium Reaction*:—

The sections are placed in a freshly prepared solution of sulphide of ammonium till they acquire a dark green colour, 10-20 minutes.

They are rinsed in water.

Alcohol. Oil. Canada balsam.

The iron appears in the form of dark green granules.

The sections may be stained with alum-carmine either before or after treatment with the sulphide.

1. Bunge, "Ueber Siderosis bulbi," *Verhandl. des intern. med. Congresses zu Berlin*, Bd. III. 1890.
2. Gruber, "Ueber Rostablagerung in der Hornhaut," von Graefe's *Archiv*, Bd. XL, Heft ii.
3. Hertel, "Anatomische Untersuchungen eines Falles von Siderosis bulbi," von Graefe's *Archiv*, Bd. XLIV, Heft ii.
4. Von Hippel, "Ueber Siderosis bulbi, etc," von Graefe's *Archiv*, Bd. XL, Heft i.
5. Leber, "Ueber Aderhautsarkome und die Herkunft ihres Pigmentes," von Graefe's *Archiv*, Bd. XLIV, Heft iii.
6. Perls, "Nachweis von Eisenoxyd," Virchow's *Archiv*, Bd. XXXIX.
7. Quincke, "Ueber directe Eisenreaction," *Archiv für exper. Pathologie*, Bd. XXXVII.

9. COPPER.

Copper in the interior of the eye can be demonstrated in sections by means of Perls' reaction (ferrocyanide of potassium and acetic acid). The impregnated tissues are coloured brown owing to the precipitation of ferrocyanide of copper.

R. Schmidt, "Ueber den Nachweis von Kupfer in den Geweben des Auges," von Graefe's *Archiv*, Bd. XLVI, Heft iii.

10. MERCURY.

Considerable attention has been paid to the detection of mercury in the tissues of the eyeball, since the deeper affections of the organ began to be treated with subconjunctival injections of sublimate.

Stuelp has shown that the chemical processes hitherto employed for this purpose are not trustworthy. A certain method for the detection of mercury has, however, been found in *electrolysis*. Stuelp proceeds as follows:—

If the aqueous is to be examined, it is mixed with a few drops of a weak solution of hydrochloric acid; while if it be the vitreous, lens, choroid, or retina, the tissue is divided into small pieces, and allowed to stand in a weak solution of hydrochloric acid for twenty-four hours before being placed in the circuit. The acidulated fluid thus obtained is placed in a glass tube, A, the lower end of which is closed by a porous membrane of parchment paper.

The cell, A, with its contents is immersed in a second cell, B, which contains a weak solution of sulphuric acid, the level of the liquid in each cell being the same. A small gold plate attached to a platinum wire is suspended in A, and a similar plate of platinum attached to a platinum wire is placed in B. The two plates should be as close together as possible, separated from each other by the membrane only. The conductor attached to the gold plate is carried to the negative (zinc) pole, and that attached to the platinum plate to the positive (carbon) pole, of an element. The circuit is then closed.

Any mercury which may be present in the liquid in A is deposited on the gold plate. After twenty-four hours the gold plate is washed in distilled water, dried, and placed in a chemically-clean glass tube. The ends of the tube are sealed by heating, and the portion of the tube where the plate is lying is gently warmed in a spirit lamp. The mercury on the plate volatilises, and is deposited on the colder portions of the tube in the form of minute drops. With a magnifying-glass these can be recognised as globules of mercury.

If, however, the quantity of mercury is very small the following method should be adopted. After being heated, the tube is filed at one end, and opened so that the gold plate can be removed. A small granule of crystalline iodine is placed in the tube, and this is again sealed. The tube is then warmed over the site of the iodine. The vapour of iodine unites with the mercury to form red iodide of mercury, and on cooling, the vapour condenses in the form of bluish-black crystals.

1. Stuelp, " Wird nach subconjunctivalen Sublimatinjectionem Quecksilber ins Augeninnere resorbirt ? " *Archiv für Augenheilkunde*, Bd. XXXI, 1895.

2. Addario, " Ueber den Nachweis von Quecksilberoxyd, etc.," von Graefe's *Archiv*, Bd. XLVIII, Heft ii, S. 375.

Stains which do not act similarly on all cells.

In recent years there have been discovered certain peculiar methods of staining, or rather of impregnation, which, unlike those hitherto known, do not act in the same manner on all the cells contained in a section, but which, as if at random, pick out a limited number of cells from the general mass. The cells selected are, however, displayed in their entirety. Only in this way has it become possible to study the form of cells which lie densely packed together. If all the cells with their processes were rendered equally distinct, the confusion resulting would prevent the recognition of any detail. These methods have in the case of the retina and optic nerve yielded astonishingly complete pictures. The cells are revealed even to their finest processes, and appear as if drawn diagrammatically. The sections should be pretty thick, so as to show, not only the cell processes which lie in the plane of the section, but also those which extend vertically into adjacent planes.

The new epoch dates from the discovery of two new methods, which are due to *Camillo Golgi*, of Pavia, and *P. Ehrlich*, of Berlin. With these names should be associated a third, that of *Ramón y Cajal*, of Madrid, who by his modification of Golgi's method rendered it applicable to wider fields of investigation and brought it into the general favour which it now enjoys.

1. Golgi's Method.

The publication of Golgi's method and the results attainable by means of it dates from the year 1875. It was only slowly, however, that its importance was recognised, and that it came to be so widely adopted as it now is. Golgi's principal work appeared in 1885. His researches were directed mainly to the study of the nervous elements in the spinal cord of fully-grown animals; and it was not till Ramón y Cajal began to apply the method to the central nervous organs of young animals and embryos that the value of Golgi's discovery was fully appreciated. Cajal, moreover, deserves credit for his successful investigations into the structure of the retina.

Golgi's method has been developed in three forms. These are described as the Slow Method, the Mixed Method, and the Rapid Method. At present the Rapid, often wrongly called Cajal's Method, is the one almost universally employed. The other methods may, therefore, be dismissed with a short description.

1. *Corrosive Sublimate Method.*

Small pieces of tissue, *e.g.*, portions of the optic nerve, are hardened for at least two months in a 2 per cent. solution of bichromate of potash, which is to be renewed from time to time. The duration of the immersion is important for the subsequent impregnation. A small piece is therefore removed from the fixing solution every ten days, and placed in an 0.35-0.50 per cent. solution of corrosive sublimate, which is renewed daily for the first ten days, and thereafter once every five days. The impregnation is complete after two months, and the pieces are then ready for cutting.

2. *Nitrate of Silver Method.*

In his later researches Golgi employed nitrate of silver instead of corrosive sublimate. Small pieces of tissue are hardened in Müller's fluid for 2 months, and are placed for 24-48 hours in a 0.75 per cent. solution of nitrate of silver. They are then quickly imbedded and cut.

3. *Rapid or Chrome-Osmium-Silver Method.*

Golgi's method demonstrates nerve fibres, ganglion cells, and neuroglia. These structures appear dark brown or black on a bright yellow background. The tissues should be taken from the animal immediately after death, and the pieces must not be larger than 1 c.cm. Usually they are chosen not thicker than 3 or 4 mm. They are placed at once in the osmio-bichromate solution, which consists of—

Solution of osmic acid, 1 per cent.	1
Solution of bichromate of potash, 3.5 per cent.	4

The precautions necessary in the employment of osmic acid ought to be observed.

The solution must not be used too sparingly. For a piece of tissue 5 mm. in diameter at least 10 c.cm. are taken. The solution should be freshly prepared. The pieces remain in it for 24-48 hours or longer, and are kept in the dark. They are then removed by means of a platinnm needle, dried on blotting paper, and placed in a

Solution of nitrate of silver, 0.75-1 per cent.

Brown clouds of chromate of silver are immediately given off. The solution is renewed, and the pieces of tissue are left in it for about 24 hours, or longer if necessary.

The pieces must then be sectioned without delay. This can be conveniently carried out if the tissue is held between two pieces of elder-pith or hardened liver, since the sections are to be thick. Or the tissue may be superficially imbedded in paraffin. A hot needle is applied to the surface of a cube of paraffin, and the tissue is placed in the cavity so formed. The author usually employs celloidin. The pieces are placed for about two minutes in 80 per cent. alcohol, for the same time in absolute alcohol, and again for an equal period in thin celloidin. They are next mounted on a block by means of thick celloidin, immersed in 80 per cent. alcohol, and are ready for cutting five minutes later.

Each section is examined in alcohol as it is cut. Worthless sections are cast aside. Those in which the impregnation has been successful are transferred for a minute to absolute alcohol, next for a minute to clove oil, and then dipped for a second in xylol to remove the clove oil which would ultimately prove injurious. They are fixed to a cover-glass by means of a thin layer of dammar. The cover-glass must not, however, be applied to the slide directly, since exclusion of air leads to destruction of the preparation. In order to protect the tissue from dust the cover is rested on two slips of glass which are glued to the slide, the side of the cover carrying the section being under.

If it is found that the sections are not well impregnated, the tissue should be removed from the block, and the process repeated beginning with the osmic acid solution. This is *Cajal's Method of Double Impregnation.*

Golgi's method is best learned by practising on the optic nerve, the delicate neuroglia cells of which are relatively easy to demonstrate. Short pieces of a fresh nerve should be chosen, and their sheaths should be removed. They are left in each of the fluids not longer than twelve hours. The sections should be thick, and cut parallel to the course of the nerve fibres.

Cajal's Roll Method.—The retina yields beautiful pictures, but is much more difficult to handle. It is best to detach it, and cut it into strips, which are rolled round a thin rod of elder-pith. To prevent the roll from unwinding it is dipped for a moment into a thin solution of celloidin. It is then exposed to a double or treble impregnation, and sections are cut at right angles to the axis of the roll. By this method a considerable length of retina is presented in each section. There is thus a greater probability of finding a layer in which the cells are well impregnated.

Formalin Bichromate Mixture.—Recently it has been discovered that formalin can be employed instead of osmic acid which is costly and difficult to manipulate. Small pieces, not more than 5 mm. in diameter, are placed in—

Formalin, 4 per cent.	1
Solution of bichromate of potash, 3 per cent.... ...	4

Here they remain for three days, and are then transferred to—

Solution of nitrate of silver, 0·75-1 per cent.

for three days.

The subsequent treatment is identical with that of the Rapid Method.

All the structures are never demonstrated in the same section. Müller's supporting fibres are first impregnated, the ganglion cells later.

2. EHRLICH'S INTRA VITAM METHYLEN BLUE METHOD.

Beautiful results are obtained by this method with different portions of the eye, and more especially with the retina. At first Ehrlich used a ¼ per cent. solution of Grübler's rectified methylen blue in normal salt solution, which was filtered and injected into the veins of the animal immediately after death. The colouring-matter is absorbed principally by nervous plexuses and ganglion cells. Other cells, however, and endothelium are affected.

The animal dies as a rule before a complete nerve stain has been obtained, if the colouring solution is injected during life. It is, therefore, better to perform the injection immediately after death. When it is desired to colour the tissues of the eye, a 4 per cent. solution of methylen blue is injected into the carotid artery. The procedure is the same as that for injecting the blood vessels. The injection is stopped when the tension in the veins is considerable. To avoid spasm of the blood vessels, which would prevent the injection from reaching the head, the solution should be warmed in a water-bath. The organs, now coloured blue, are removed from the body. The stain is intensified by exposing the preparation to the air for some time. Continued exposure causes it to fade. The preparation should, therefore, be examined under the microscope, and fixed quickly when the maximum effect has been obtained.

The method is naturally rarely applicable to the human subject. For this reason and on account of its greater simplicity Dogiel's modification of the method is a marked improvement.

S. Meyer recommends the introduction of the methylen blue by means of subcutaneous injections, each of 2 c.cm., at intervals of $\frac{1}{4}$ to $\frac{1}{2}$ an hour. The solution should be saturated and used at a temperature of 37° C. Death follows after 3-6 injections.

Dogiel's Process.—Dogiel showed that the tissues of the recently enucleated eye could be impregnated equally well if the colouring fluid was allowed to reach them from their margins.

In the case of the retina the procedure is as follows (*Archiv für mikrosk. Anatomie*, Bd. XL., S 34): For successful staining it is requisite that the examination be made immediately, at all events not later than 3-4 hours, after the removal of the eye.

The organ is divided in the equatorial region into an anterior and posterior half. The posterior half is again divided, most conveniently by meridional incisions, into three or four pieces.

A segment of retina is now carefully detached with forceps from the choroid, and transferred along with some vitreous to a large slide. On this it is spread out, the nerve fibre layer being uppermost, and covered with more vitreous to prevent drying during the examination.

A few drops of $\frac{1}{16}$ per cent. methylen blue solution are placed on the preparation, or rather applied to its margins.

Staining of the nervous elements begins at the circumference very soon, usually in the course of 15-20 minutes. Progress is watched under the microscope. The axis-cylinders stain first, then the cells. Several hours may elapse before the nervous elements of all the layers are coloured.

The process can be hastened by placing the slide in the incubator at 35°-40° C., and examining every five minutes to determine when staining is sufficiently advanced. The methylen blue solution is applied to the margin of the tissue from time to time.

So far all is simple. It is, however, most important to interrupt the process at the right moment, and to fix the stain. Herein lies the difficulty. If staining is carried too far the capillaries become filled with the methylen blue, and finally so many structures are coloured that it is no longer possible to distinguish individual cells.

Dogiel fixes in this manner.—The vitreous covering the specimen is removed, and the surface of the retina is moistened with a saturated aqueous solution of ammonium picrate. The preparation is now placed under an inverted watch-glass and left protected from the air till next day. The fixing solution is then replaced by a mixture of equal parts of chemically pure glycerine and water, and a cover-glass is applied. To prevent pressure the glass rests on a circle of thick paper placed around the tissue. The paper should be saturated with glycerine.

After one or two days the preparation has usually attained such a degree of transparency that, by focussing, the branching of the nervous elements in the different layers of the retina can be clearly distinguished.

Apathy (*Zeitschr. für wissenschaftl. Mikroskopie*, Bd. XIX) has improved the method of fixation essentially by adding to the picrate of ammonia a few drops of strong liquor ammoniæ. The preparation is mounted in a solution of gum arabic and sugar.

Kallius (*Anatomische Hefte*, Bd. III, Heft x, 1894) directed attention to the fact that tissues treated with Apathy's fixing fluid could, when quickly dried in the incubator at a moderately high temperature, be mounted in Canada balsam under a cover-glass. In this way he had secured excellent specimens which, as the author can testify, have kept well for a long time.

Bethe has introduced an admirable method of fixing. It possesses, amongst other advantages, that of allowing the stained pieces of tissue to be imbedded in paraffin or celloidin and cut with the microtome. Small pieces are stained in the usual way in a watch-glass or on the slide (Dogiel).

Bethe proceeds as follows :—

1. After staining is complete, the excess of colouring-matter is washed away by salt solution.

2. The tissue is transferred to the fixing fluid. In the case of the retina, however, it is better, after removing the vitreous, to leave the tissue on the slide, to pour the fixing fluid over it, and then to protect it from the air.

Bethe recommends as a fixing fluid—

Molybdate of ammonia	1 gramme
Distilled water	10 c.cm.
Peroxide of hydrogen	1 c.cm.
Strong hydrochloric acid	1 drop

This solution does not keep longer than eight days. It should be used as cold as possible, and preserved in a vessel surrounded by ice. It is applied in the cold state for 2 or 3 hours, and after this can be left to act a little longer at the ordinary temperature of the room.

3. Washing for ½-2 hours to remove the molybdate of ammonia.

4. Dehydration as quickly as possible with cold alcohol, 80 per cent. It is important that the alcohol should be cooled in ice or snow, otherwise it extracts the colouring matter. The tissue may be left for several hours in the cold alcohol, where it undergoes further hardening.

It is now dehydrated in absolute alcohol, imbedded in paraffin or celloidin, and sectioned.

The natural blue tone of the stain is preserved by Bethe's method of fixing, whereas, after Dogiel's fixation process, the blue becomes dark violet.

(*To be Continued.*)

CURRENT LITERATURE.

NOTE.—Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—COMPARATIVE ANATOMY.

(1) **Menacho, Manuel.—The eye of the Typhlocirolana from the Cave of Hams, on the Island of Majorca. (Das Auge der Typhlocirolana aus der Höhle "dels Hams" auf der Insel Mallorca.)** *Arch. f. vergleich. Ophth.*, Bd. III, Heft i, Juni 18, 1912, S. 1.

(2) **Wychgram, Engelhard.**—The Ligamentum pectinatum of the bird's eye. (Ueber das Ligamentum pectinatum im Vogelauge.) *Arch. f. vergleich. Ophth.*, Bd. III, Heft i, Juni 18, 1912, S. 22.

(3) **Ischreyt, G.**—The comparative morphology of the eye in the duck family. (Zur vergleichenden Morphologie des Entenauges.) *Arch. f. vergleich. Ophth.*, Bd. III, Heft i, Juni 18, 1912, S. 39.

(4) **Gaskell, W. H.**—Note on Mr. B. H. Buxton's paper "On the origin of the vertebrate eye." *Arch. f. vergleich. Ophth.*, Bd. III, Heft i, Juni 18, 1912, S. 84.

(5) **Zietzschmann, Otto.**—The orbital arteries of the horse. (Die Orbitalarterien des Pferdes.) *Arch. f. vergleichende Ophth.*, Bd. III, Heft ii, Juli, 1912, S. 129.

(1) In the cave of Hams, in the Island of Majorca, brackish lakes are found which contain crustaceans similar to those present in the sea, but blind and colourless. It seems probable that the connection of these lakes with the sea has been interrupted by an earthquake, and now only takes place indirectly by filtration. **Menacho** (Barcelona) deals with an isopod crustacean, the Typhlocirolana. As compared with its marine fellows, its eyes show three changes—1. Absence of pigment. 2. Atrophy of the crystalline cone. 3. Atrophy of the proximal part of the retinule. The peripheral optic ganglion shows but little alteration. Researches in other blind animals have shown that up to a point the eyes develop normally in the larva; their atrophy is therefore not racial or hereditary, but due to their function remaining in abeyance. GEORGE COATS.

(2) The exact position during life of the ligamentum pectinatum in birds seems to be still a matter of dispute. Franz has even stated that the appearance seen in sections is artificial and due to dilaceration. It is certainly true that the bird's eye, owing to the presence of a bony ring at the periphery of the cornea, and to the thinness of the cornea itself, is peculiarly liable to partial collapse and distortion. **Wychgram** has therefore studied the condition of the ligament in the pigeon, crow, and kestrel after fixation by various methods, and in both mydriasis and myosis. He finds that the ligament is a very well defined structure divided into three parts.—1. A band passing to the anterior surface of the iris; it often arises from a special promontory to which also the muscle of Crampton may be attached. 2. Fibres going to the anterior part of the ciliary muscle. 3. Loose fibres filling up the spaces between these last and the extreme angle. During accommodation the fibres of the ligamentum are very taut. The explanation seems to be that accommodation in the bird is due to compression of the lens by the iris and ciliary body, and that the ligamentum acts as a check against excessive action. For this reason it is strongly developed in the cormorant, which has a very powerful accommodation. Some points in the structure of the ligamentum receive consideration. GEORGE COATS.

(3) The duck family may be divided into: (1) the swimmers, which keep close to the coast and seek their food in the deposits at the bottom of the sea. They probably depend mostly on tactile sensations and do not require vision under the water. (2) The divers proper, some of which (*e.g.*, the sheldrake) feed on small water snails, etc., and having taken a certain line in diving, must keep it; while others (*e.g.*, the merganser) swim about freely under water in pursuit of their prey. These require vision in the water, and can be observed in the aquarium to keep their eyes open. It is evident therefore

that a comparative study of the two groups is likely to lead to interesting results, especially as they are otherwise nearly allied, so that any changes found will probably be really the result of the animal's habits, and not due to racial peculiarities.

This research has been undertaken by **Ischreyt** (Libu) in seven species of duck. He finds that the cornea in the whole group is relatively thin. In the swimmers the sclera is thickest at the sclero-corneal margin, in the divers at the equator; in both it is thicker in front of than behind the equator, and usually also thicker on the temporal side. The chief differences, however, are associated with the fact that the divers require a much more powerful accommodation apparatus when the curvature of the cornea is annulled by its immersion in water. They have therefore a much-developed sphincter (in the bird one of the muscles of accommodation), muscle of Müller (running between the periphery of the cornea and the choroid), muscle of Brücke (running between the sclera and the choroid), and an elastic band (a structure whose function seems to be to prevent excessive dragging forward of the choroid in accommodation), while the ciliary processes are few, wedge-shaped, and fibrous, and the muscle of Crampton (attached to the periphery of the cornea and to the sclera) is weak. The greater length of the eye in the divers is also probably a device for obtaining accommodation for near objects with a relatively small effort on the part of the ciliary muscle. The divers have an unusually thick layer of endothelium on the anterior surface of the iris.

Another interesting modification in the divers is found in the nictitating membrane, which is transparent in the centre, so that under water it presumably protects the eye and at the same time acts as a window. In agreement with this supposition, the epithelium of the membrane is thick, while that of the cornea itself is thin.

The structure of the eye of all the swimmers is exactly alike, whereas among the divers some have eyes which present all the above characters in typical form, while others seem to be transitional towards the swimmer type. From the standpoint of phylogeny, therefore, it seems most probable that the eye of the swimmers is the primitive form, which has undergone modification in the divers to meet special requirements. GEORGE COATS.

(4) The originality of Buxton's ideas on the origin of the vertebrate eye is disputed by **Gaskell**, of Cambridge, who shows that his main points were all anticipated in a paper published in the *Quarterly Journal of Microscop. Science* in 1890, and again in the well-known book "The Origin of Vertebrates," published in 1908, the second chapter of which is entirely devoted to the "Evidence of the Organs of Vision." Buxton is accused also of reprinting, without acknowledgment, some of the illustrations from this book.

GEORGE COATS.

(5) It is scarcely necessary perhaps to follow, with the author of this careful paper, all the minute branches and minute variations in the orbital circulation of the horse. The characteristic difference which distinguishes all the lower vertebrates from the primates is the great share taken in the blood supply of the globe and its adnexæ by branches of the internal maxilliary artery, a difference which, as Henderson has pointed out, is perhaps not always sufficiently regarded in experimental work.

The branch of the internal maxillary artery which supplies the orbit is termed the "arteria ophthalmica externa," and usually arises from the parent trunk between the foramen ovale and the pterygo-palatine fossa. A second branch, which is given off along with the infraorbital artery, is called the "arteria malaris." From the external ophthalmic artery a special branch—the "ramus bulbi"—is given off for the supply of the globe. It runs above the nerve, and then along its dorso-nasal side, finally breaking up into nasal and temporal ciliary vessels which give off short twigs corresponding with the short ciliary arteries of man, while the terminal branches run on as long ciliary arteries to supply the anterior intra-ocular structures. Most animals have also an "arteria ophthalmica interna" derived from the internal carotid and entering by the optic foramen; an anastomosis usually exists between the two, most often by their ciliary branches.

According to the preponderance of the maxillary or carotid supply, a "maxillary" or "cranial" type of orbital circulation may be distinguished in different animals. In the bat the contribution from the side of the carotid seems to be absent; in the cat, ox, sheep, and goat it is very poorly developed; in the horse, dog, and hare its importance increases; while in man, of course, it constitutes practically the whole orbital supply. The ophthalmic artery of man corresponds therefore with the internal ophthalmic of animals, but the maxillary supply, although of little importance, is not wholly unrepresented; certain small muscular branches which arise from the buccal branch of the deep temporal artery and pass upwards through the spheno-maxillary fissure are all that remain of the external ophthalmic artery, while the malar artery, of considerable importance in the horse, is represented in man by minute twigs from the infraorbital. GEORGE COATS.

II.—MELANOSIS.

(1) **Coats, George.—Unilateral diffuse melanosis of the uvea, with small elevations on the surface of the iris.** *Trans. Ophth. Soc. U.K.*, Vol. XXXII, Fasc. 2, p. 165, 1912.

(2) **Collins, E. Treacher.—Unilateral melanosis of the uvea and sclera, with numerous small elevations on the surface of the iris.** *Ibidem*, p. 171.

(1) **Coats**, of London, reports the case of a girl of seventeen years whose left eye showed melanosis of the scleral and episcleral tissues. There had been a considerable increase in the pigmentation of the eye within the patient's memory. The peculiarity of the case, however, lay in the fact that, when examined by a magnifying glass, the iris, which was much darker than the iris of the other eye, was found to be covered with minute, discrete, pigmented elevations, the appearance being comparable with the familiar "goose skin." This observation is believed by Coats to be new.

In view of the rarity of melanosis, Coats gives references to cases, ancient and modern. As the outcome of his enquiries, he finds that a melanotic sarcoma (extra-bulbar or of the choroid) has been present in no fewer than seven out of about twenty-six cases. It is evident, then, that diffuse melanosis of the uvea is a condition to be regarded with some anxiety.

SYDNEY STEPHENSON.

(2) The case reported by **E. T. Collins**, of London, occurred in a girl of twelve years, and had been under his observation during a period of ten years. The left iris was dark brown, and areas of brown pigmentation were present in the anterior parts of the sclera. On high magnification, the left iris was seen to be covered with minute conical elevations. SYDNEY STEPHENSON.

III.—THE OCULAR MANIFESTATIONS OF ERYTHEMA MULTIFORME.

Salus, R.—Erythema exudativum multiforme in the eye. (Erythema Exudativum Multiforme am Auge.) *Klin. Monatsbl. f. Augenheilk.*, Januar, 1912.

One of the groups into which cases of conjunctivitis crouposa can be divided embraces the ocular manifestations of two general conditions belonging to the region of dermatology, namely, pemphigus and erythema exudativum multiforme. **Salus,** of Prague, records two cases belonging to the latter category. In the first case, a man aged 57, there was a membranous conjunctivitis, along with membranous pharyngitis and stomatitis. The condition of the right eye was severe. A thick membrane stretched across from the lid margins to the globe, covering the plica, and giving an appearance of symblepharon. The membrane could be easily detached. The cornea showed maceration of its epithelium and a delicate grey opacity. The left eye was similarly, but less severely, affected. Films of the discharge showed abundant polynuclear leucocytes, but no bacteria The temperature was subfebrile. The second case was a man, aged twenty-nine years. He also had an affection of his mouth, and efflorescences in the palm of his hand and inside of the prepuce. Here, also, the appearance of the membrane suggested symblepharon. The corneæ were clear. The discharge contained abundant polynuclear leucocytes, some mononuclear, and no eosinophiles. The temperature was subfebrile.

Erythema exudativum multiforme, a condition particularly common in Turkey, may affect the skin, mucous membranes, and conjunctiva, separately or in combination. A fairly common condition is the simultaneous affection of the skin and conjunctiva. The conjunctival affection may precede the skin condition by several days, or may come on three or four days later. It may assume a catarrhal, a croupous, or a papular form. The catarrhal form differs from other forms of conjunctivitis in the absence of bulbar injection, subjective symptoms, and discharge, and in the presence of a translucent œdema of the ocular conjunctiva. The papular form is the most common. These conjunctival complications represent a real manifestation of the specific disease, modified, as compared with the skin lesions, by the different anatomical structure of the parts. The catarrhal form represents the erythematous form seen on the skin ; the croupous is the vesicular or bullous form, and affects both conjunctiva and cornea ; while the papular form appears quite characteristically on the bulbar conjunctiva. No affection of the conjunctiva occurs which corresponds to erythema or herpes iris. The cases so-called belong to the second and third groups given above.

A. J. BALLANTYNE.

IV.—TUMOURS OF THE CONJUNCTIVA AND CORNEA.

(*First Notice.*)

(1) **Fortunati.—Endothelial perithelioma of the palpebral conjunctiva and culs-de-sac.** *Annali di Ottalmologia*, Vol. XXXV, Fasc. 12, pp. 941 to 952, with figures.

(2) Trousseau.—Muco-fibroma of the bulbar conjunctiva. (Fibrome muqueux de la conjonctive bulbaire.) *Ann. d'Oculistique*, T. CXXXV, p. 197.

(3) Contino.—Large cysts of Krause's glands. Histological examination. (Grossa cisti della ghiandole di Krause. Con particolare reperto istologico.) *La Clinica Oculistica*, July, 1906.

(4) Petit, Paul.—Epithelioma of the caruncle. (Epithélioma de la caroncule.) *Ann. d'Oculistique*, T. CXXXVI, p. 37.

(5) Castelain.—Angioma of the conjunctiva. (Angiome de la conjonctive.) *Ann. d'Oculistique*, T. CXXXVII, p. 113.

(6) Baslini.—A contribution to the clinical and anatomical study of lymphoma of the conjunctiva and tarsus. (Contributo allo studio clinico e anatomico del linfoma della congiuntiva e del tarso.) *La Clinica Oculistica*, Maggio, 1907.

(7) Menacho.—The affections of the plica semilunaris and the caruncle. (Afecciones de la caruncula lagrimal y del repliegue semilunar.) *Archivos de Oftalmologia Hisp.-Amer.*, Julio, 1907.

(8) Fernandez.—Two cases of papilloma of the plica semilunaris. (Dos papilomas del pliegue semilunar de la caruncula.) *Ibidem.*

(9) Dujardin.—Vision restored by accidental removal of an epithelioma of the conjunctiva. (Zufällige Beseitigung einer durch Bindehautepitheliom bewirkten Blindheit.) *Die Ophthal. Klinik*, 20 September, 1907, 550.

(10) Luisa, Ancona.—A case of symmetrical angiomata of the superior tarsal conjunctiva. (Un caso di angiomi simmetrici della congiuntiva tarsale superiore.) *La Clinica Oculistica*, Gennaio, 1908.

(11) Hilbert.—A case of polypoid tumour of the conjunctiva. (Zur Kasuistik der polypoiden Geschwülste der Bindehaut.) *Centralbl. für prak. Augenheilkunde*, Mai, 1908.

(12) Bartels, M.—(1) A tumour of the ocular conjunctiva with a follicle and mucous cysts (Atypical vernal catarrh ?). [Tumor der Conjunctiva bulbi mit Follikel und Schleimcysten (Atypischen Frühjahrskatarrh ?)] (2) A description of Manz' glands, and a discussion on their relationship to the Cysts. (Darstellung der Manzischen Drüsen und ihr Beziehung zu den Cysten.) *Zeitschrift für Augenheilkunde*, September, 1908.

(13) Krämer, R.—Tuberculoma of the conjunctiva bulbi and its diagnostic difficulties. (Das Tuberkulom der Conjunctiva bulbi und seine diagnostischen Schwierigkeiten.) *Zeitschrift für Augenheilkunde*, Mai, 1909.

(14) Mann, W. A.—Congenital fibroma of the cornea. Report of a case. *Journal of Ophthalmology and Oto-Laryngology*, June, 1909.

(1) The interest of this observation by **Fortunati**, of Rome, lies in the histological description, which does not lend itself to abstract, and in the accompanying figures. The neoplasm of which he speaks would seem to have, in contradistinction to endothelial sarcoma, a certain benign character, on account of the tendency of the new-formed elements to amyloid degeneration. In general, endothelioma of the conjunctiva would appear to be very rare.

A. Antonelli.

(2) **Trousseau**, of Paris, removed from the inner side of the eyeball of a man, aged 57, a tumour the size of an olive, which had been growing for fifteen years. On examination, this proved to be a fibroma undergoing mucous degeneration. The author believes that no case of muco-fibroma of the sub-mucous tissue of the bulbar conjunctiva has been previously published.

R. J. COULTER.

(3) **Contino** gives an account of this uncommon condition, together with a detailed anatomical and histological description. From this it appears that the cyst is a dacryops of an accessory lacrymal gland. HAROLD GRIMSDALE.

(4) **Petit** removed a tumour the size of a pea from the surface of the caruncle of the left eye of a lady, aged 82 years. This had been noticed to be present for about a year, and had been increasing in size for a month. A detailed illustrated description is given of the histological examination, which showed the neoplasm to consist of stratified epithelium containing cell-nests and invading the subjacent tissues. Two years later, there was no sign of recurrence. The author has been able to find only two other recorded cases.

R. J. COULTER.

(5) **Castelain** gives a *résumé* of what is known about angioma of the conjunctiva, together with a short description of two cases which have come under his own notice. He recommends the following treatment.—1. When the tumour is pedunculated: ligature of the base, excision, or thermo-cautery. 2. When the tumour is small and definitely localised: positive electrolysis, or excision. 3. When the tumour is extensive: bipolar electrolysis or thermo-cautery. R. J. COULTER.

(6) **Baslini's** patient, a boy aged 10, had suffered from chronic conjunctivitis for four years. For two months he had noticed the left upper lid becoming thickened, so that lately he had not been able to raise it. Examination showed a much thickened tarsus and gross granulations of the tarsal conjunctiva. There was slight pannus. To hasten the cure, the tarsus of the upper lid and the conjunctiva were removed together. The boy was soon able to return home, and eventually recovered, with very slight scarring, and V.=2/3. Microscopical examination of the tissue removed showed that the conjunctival epithelium was in great part thrown off, and the sub-epithelial connective tissue and superficial layer of the tarsus were thickly infiltrated by lymphocytes and young connective cells. The connective tarsal trabeculæ appeared much hypertrophied and extended towards the conjunctiva. Between the bands were spaces filled with numerous lymphocytes and a few new connective tissue cells. Some trabeculæ were in process of hyaline degeneration.

HAROLD GRIMSDALE.

(7) This is a paper by **Menacho** containing a short review of the various tumours which affect the parts, illustrated by some clinical cases.

HAROLD GRIMSDALE.

(8) **Fernandez.**—Clinical notes of two cases of papilloma of the plica semilunaris. HAROLD GRIMSDALE.

(9) An epithelioma growing over the cornea of one eye was rendering **Dujardin's** patient quite blind—the other eye having been lost through an injury—when on leaving the surgeon's rooms one day, he accidentally hit his head against a tree. The blow detached the growth from the cornea, and so restored the patient's vision. Previous to this, an operation for removal of the eye had been refused. PERCIVAL HAY.

(10) An infant was found to show this rare abnormality.

HAROLD GRIMSDADE.

(11) **Hilbert**, of Sensburg, reports a case of this extremely rare condition which occurred in a young man, *æt.* 20 years, who had suffered from conjunctivitis

for some weeks, accompanied by watering and a feeling as of sand in the eye. On everting the lid, there was seen springing from the fornix a pear-shaped tumour, about 1 cm. long. At its attached base it was as fine as a thread and at its extremity it was about 2 mm. in diameter. In colour it was bright red, like the rest of the conjunctiva, of soft consistency, and its surface was slightly granulating. It was snipped off with a pair of scissors and its base cauterised. The cure has remained permanent. A. LEVY.

(12) **Bartels**, of Strassburg, examined a small sessile tumour which had been excised from the conjunctiva of a healthy girl, aged 12 years. The tumour was flat and pale, and lay between 10 and 12 o'clock on the left eye, reaching to within 2 mm. of the corneo-scleral margin. It could be moved slightly upon the sclera. There was no injection of the eye. The growth has not recurred. The tumour, after hardening in alcohol, measured 13 mm. by 10 mm., and was 1·5 mm. thick. The histological characters are clearly shown in the drawings which accompany the article. The goblet cells of the conjunctiva are greatly increased in numbers, compressing the neighbouring cells. Eosinophil cells are here more numerous than they should be. The sub-epithelial tissue shows an enormous increase of cells, which are shown by the Unna-Pappenheim pyronin-methylgreen stain to be plasma cells. Connective tissue cells are infrequent. The special character of the growth is due to a large number of mucous cysts, which are best seen in a preparation stained with toluidine blue. A large follicle is present at one spot, which is well shown in the plates. It is almost entirely composed of lymphocytes, with a few eosinophil and plasma cells.

Bartels discusses the nature of the growth, which is characterised by this single follicle, and by the numerous mucous cysts and goblet cells. Is it an atypical form of Spring Catarrh, or is it derived from those conjunctival glands which have been loosely grouped together under the term "Manz' glands"?

Two varieties of gland are described as Manz' glands: a convoluted structure, which was originally discovered by Meissner, and a plain sac-like gland, which Manz found in the limbus of a pig's eye. These glands have not been seen in the human eye; although the convoluted variety is common in many animals, especially in the calf.

Bartels suggests that possibly the tumour under discussion may in some way be associated with the sac-like glands of the pig's eye, a kind of atavistic "throw back"; but he comes to no definite conclusion.

T. HARRISON BUTLER.

(13) Tuberculosis of the conjunctiva bulbi, without participation of the conjunctiva of the lids, is a very rare condition. The pseudo-tumour is so like a real tumour that the diagnosis is very complicated. Lafon first suggested the term "tuberculoma." **Krämer**, of Vienna, describes a case the main characteristics of which are as follows.—There was a history of five months' growth. At the limbus was a tumour, as large as half a hazel nut, of cartilaginous hardness. The tumour could not be moved upon the sclera, and was closely connected with the conjunctiva. When the tumour was removed, a perforation was found in the sclera, laying bare the ciliary body. A histological examination showed that the tumour was not malignant but was a tuberculous mass, a tuberculoma. A careful examination of the lungs disclosed apical infiltration. The eye made a complete recovery, the patient being subjected to a course of injections with emulsion of tubercle bacilli. The author advises that such cases be tested by an injection of tuberculin; for a local reaction often clears up the diagnosis. T. HARRISON BUTLER.

(14) **Mann**, of Chicago, reports a congenital fibroma of the cornea in a young woman, aged 19 years. "The tumour was on the right eye, occupying the

upper part of the cornea, slightly towards the nasal side. It was flattened, 4 mm. thick in the centre and 8 mm. in diameter. It extended from just above the limbus to a little below the centre of the cornea. The colour was pinkish, and the tumour vascular. Vision 1/100. The lid closed over the tumour." The tumour had not enlarged since birth, and the diagnosis of a benign growth was made clinically and confirmed by the pathologist, who reported that the tumour was a fibroma. HENRY L. G. LEASK.

V.—PARINAUD'S CONJUNCTIVITIS.

(1) **Krauss, Frederick, and Boyle, M. P.—Report of a case of Parinaud's conjunctivitis with unusual complications.** *Annals of Ophthalmology*, Vol. XIX, January, 1910, p. 52.
(2) **Matthewson.—Parinaud's conjunctivitis with report of a case.** *Ophthalmic Record*, December, 1910.
(3) **Keiper, George F.—Parinaud's conjunctivitis with report of a case.** *Ophthalmic Record*, January, 1911.
(4) **Meisner, W.—Parinaud's conjunctivitis and conjunctival tuberculosis. (Die Parinaud'sche Konjunctivitis und die Tuberkulose der Bindehaut.)** *Zeitschrift für Augenheilkunde*, Februar, 1912.
(5) **Adam, C. and Watzold, Staff-Surgeon.—On conjunctivitis tuberculosa (Parinaud's disease).** v. Graefe's *Arch. f. Ophth.*, March 26th, 1912.

(1) **Krauss and Boyle** report a case of this disease which presented some unusual features, *viz.*:—(1) The patient, a negro child, aged two-and-a-half years. (2) The colour of the patient, only one other case having been reported in a negro. (3) The disease extended into the lacrymal sac, causing a purulent discharge from the nose. (4) The very free purulent secretion from the eye continued for a considerable length of time. (5) The cultures taken were negative bacteriologically, the usual flora of the conjunctiva being present. (6) There was no history of tuberculosis, but there was a strongly marked reaction to the v. Pirquet test.

The treatment employed consisted of frequent cleansing with boric acid solution, the daily application of silver nitrate (2 per cent.), neutralised immediately, frequent applications of argyrol, and tonic treatment internally. Most of the granulations were excised. J. WHARTON.

(2) In this case by **Matthewson**, of Montreal, a lady 33 years of age, showed swelling and eczematous redness of the left eyelids and neighbouring parts of the face. Moderate mucous discharge from the left eye, and marked swelling of the upper tarsal conjunctiva, which was irregularly thickened by a large number of reddish trachomatous-looking nodules; near the middle of the upper border of the tarsus was a small shallow ulcer. The conjunctiva of the lower lid and eyeball was practically normal; the left preauricular gland was enlarged and tender; and a smear from the conjunctival secretion showed only a few cocci. Treatment: boric lotion, argyrol drops, and cold compresses. Three days later, enlargement of submaxillary glands. Ulcer touched with 2 per cent. silver nitrate every day until it healed on the eleventh day. Bulbar conjunctiva became œdematous on the fourth day, and at the end of a month the preauricular gland had become as large as a pigeon's egg and showed fluctuation. It was incised, and about a drachm and a half of thick greenish pus evacuated. It was stained for T.B. but gave a negative result, and cultures showed nothing but saprophytic bacteria (proteus). The eye was

normal at the end of two months. The presence of ulcers is not usual in these cases. It has occurred in about 12 per cent. of cases reported.

J. JAMESON EVANS.

(3) **Keiper**, of Lafayette, reviews the literature on Parinaud's conjunctivitis and gives a good bibliography. He comes to the conclusion, from the evidence obtained, that "if the disease is due to a bacterium, our present means of diagnosis are inadequate. That it is due to an infection there can be no doubt. That it is contagious is very doubtful. That as yet there is no agreement as to what is best to be done in treating any individual case."

His case was that of a farm labourer, whose face and neck glands on the right side were swollen and tender. The lids were thick and heavy, swollen and shut. The palpebral and ocular conjunctiva were chemosed, and there was slight discharge from between the lids. The cornea was unaffected. The temperature was slightly elevated. The everted upper lid seemed swollen into one large granulation, under the overhanging edges of which were some smaller ones, but they did not bleed readily. The lower lid showed a similar condition. The other eye was normal and remained so. Bacteriological examination was negative.

Treatment consisted of daily application to the everted lids of 2 per cent. solution of silver nitrate, bathing the eye every hour with hot compresses, every three hours a 10 per cent. solution of protargol was dropped into the eye, and every hour the eye was flushed with the following collyrium :—

℞ Zinc phenolsulphate, gr. i., acid boric, gr. x., aq. dest. ℥ i.

Between the treatment and bathing, the eye was kept bandaged. Internally, patient was given several purges of calomel, and quinine and iron. Later, the iris became sluggish, and atropine drops were added. The lower part of the cornea became infiltrated at the end of the second week of treatment, but, fortunately, the remaining opacity was negligible. J. JAMESON EVANS.

(4) **Meisner**, of Königsberg, reviews the literature of Parinaud's conjunctivitis, laying particular stress upon cases in which the association between this disease and tuberculosis has been noted. He then describes an example of his own, which was conclusively proved to have a tuberculous ætiology.

The disease was first described by Parinaud in 1899 in a paper read before the Paris Ophthalmological Society. In 1906, in the *Klinische Monatsblätter*, Karl Hoor made a critical analysis of all the cases which had been published.

The symptomology is shortly as follows.—There is a history that the patient has had some association with animals, especially cattle; he is generally a butcher, a cattle-herd, or a veterinary surgeon. One eye is alone affected. The onset is gradual and almost painless, the symptoms being generally those of a fairly severe conjunctivitis. The preauricular glands may become swollen, and this may drive the patient to the doctor. Examination shows a condition of the lids suggestive of trachoma. On the reddened and swollen conjunctiva there are greyish-red to yellow nodules which may ulcerate superficially, and, as Parinaud himself remarked, may present the picture of a tuberculous conjunctivitis. In severe cases the conjunctiva bulbi may be affected, but it is usual for the eye itself to escape except for small peripheral infiltrations and ulcers. The preauricular glands become swollen, also those in the parotid region and in the neck. These glands may, or may not, suppurate. The malady generally rapidly yields to ordinary therapeutic methods, such as painting with silver nitrate, and often no scars remain behind. In four or five months the disease is at an end. Recurrences have so far not been observed.

This description is exceedingly similar to one given by Sattler of his second group of conjunctival tuberculosis. In fact, the language might be adopted word for word. Even the mild course of the disease is matched by some cases of tuberculosis. This great similarity has suggested to experienced clinicians that Parinaud's conjunctivitis may really be a tuberculosis, but investigations into the bacteriology of the disease by Morax and Cornil were negative as regards tubercle bacilli. Krückmann describes two cases which eventually turned out to be tuberculous. Wessely succeeded in fatally infecting an ape with tuberculosis by inoculation from a case of Parinaud's disease, and also in infecting a rabbit and a guinea pig. Wessely considered that he was dealing with bovine bacilli.

Schreiber, Wagenmann, and Seigrist have each described a case which, although clinically Parinaud's disease, was in reality tuberculosis of the conjunctiva.

The author's case was the eight year old daughter of a cabman. In this case, a typical example of the disease, a positive reaction was given to one injection of old tuberculine (0·5 milligram), and pieces of the softened preauricular gland were inoculated into guinea pigs with a positive result. Tuberculosis of the iris of a rabbit was also successfully produced.

The rest of Meisner's paper is devoted to a consideration of the differences between bovine and human bacilli and the infections they respectively produce.

T. HARRISON BUTLER.

(5) The tuberculous nature of Parinaud's disease has been established by Wessely. It appears to be mostly due to inoculation with the bovine virus. **Adam** and **Watzold**, of Berlin, describe a very protracted case, where inoculation with excised particles gave a positive result, and where bacilli were abundantly present.

R. GRUBER.

VI.—CHLOROMA.

(1) **Wynter, W. Essex. (London.)—A case of chloroma.** *Proceedings Royal Society of Medicine*, November, 1909.

(2) **Wynter, W. Essex.—Sequel to a case of chloroma.** *Ibidem*, March, 1910.

(3) **Tresilian, Fred.—A case of chloroma.** *Brit. Journ. Children's Diseases*, December, 1910.

(4) **Hudson, A. C.—A case of chloroma.** *Royal London Ophthalmic Hospital Reports*, Vol. XVIII, Part II.

(1) The ocular signs in **Wynter's** supposed case of chloroma, which occurred in a female, aged 3¼ years, were proptosis and papillitis affecting both eyes. The peculiar interest lies in the fact that very few attempts have been made to diagnose the condition before death.

ERNEST THOMSON.

(2) The child whose case is briefly reported above died from asthenia. The autopsy revealed diffuse chloromatous growth, transforming all the red marrow, and being conspicuous in the flat bones and ends of the long bones. There were also deposits beneath the periosteum. Glands and spleen were affected.

SYDNEY STEPHENSON.

(3) This case by **Tresilian**, of Enfield, Middlesex, occurred in a boy, six years of age, whose illness began with complaints of pain in the left knee. Later, he became anæmic and developed enlarged glands in the abdomen. The eyes were prominent, the temples full, and there were hard swellings at the back of the head. The glands of the neck, axillæ, and groins were enlarged. The spleen was also enlarged. A blood-slide showed an abundance of large and small lymphocytes. Towards the end, there was pronounced proptosis, and a convergent squint made its appearance.

SYDNEY STEPHENSON.

(4) This is an account, by **Hudson**, of London, of the progress of a case of chloroma in a child of seven years which terminated fatally after four weeks in hospital. The ocular symptoms, on admission, were great proptosis on both sides with impaired movements; the whole of the right, and part of the left, cornea showed superficial ulceration, and no view of the deep parts could be obtained. The ocular conjunctiva was congested and protruded between the lids, which were œdematous, the lower also ulcerated: the superficial veins were distended. A detailed *post-mortem* examination was made, and sections were cut of various parts and organs. Between the roof of the orbit and the levator palpebræ on each side was a greenish brawny mass about half-an-inch thick; the rest of the orbital contents were normal. This mass, in common with similar formations in other parts, consisted of a diffuse infiltration of the tissues with a peculiar granular cell, about twice the size of a red blood cell, with a nucleus, generally, but not always round, and a broad band of protoplasm containing chiefly neutrophile, and sometimes eosin, granules. These cells were also seen in the capillary blood vessels, and thought to resemble the myelocytes in leukæmia. In the periphery of the mass there was much fibrous tissue and the cells were degenerate. The bone of the roof of the orbit was not eroded. The tissues of the eye itself were free, but the blood vessels, especially of the choroid, contained the characteristic granular cells.

The paper concludes with a discussion as to the nature of the disease, and reference to other recently recorded cases. A. H. PAYAN DAWNAY.

VII.—AFFECTIONS OF THE HYPOPHYSIS CEREBRI.

(1) **Lawford, J. B.—Optic atrophy and oculo-motor palsy; new growth in the region of the pituitary fossa.** *Transactions of the Ophthalmological Society U.K.*, Vol. XXX. Fasc. 2, 1910.

(2) **Lafon, Ch.—Two cases of tumour of the hypophysis. (Deux cas de tumeur de l'hypophyse.)** *Recueil d'Ophtalmologie*, mars, 1911.

(3) **Levy, A.—Dystrophia adiposo-genitalis, with optic atrophy of right eye.** *Trans. Oph. Soc. U.K.*, Vol. XXXII, Fasc. 1, p 108, 1912.

(4) **Evans, J. Jameson.—Some manifestations of pituitary growths.** *Birmingham Medical Review*, January 15th, 1912.

(5) **Toupet, René.—The diagnosis and treatment of tumours of the hypophysis. (Diagnostic et traitement des tumeurs de l'hypophyse.)** *Gazette des Hôpitaux*, 17 février, 1912.

(1) In the case reported by **Lawford**, of London, a man, aged forty-nine years, there were double optic atrophy, double oculo-motor disturbances with proptosis, almost complete loss of the sense of smell without nasal abnormality, and radiographically "rather a deep erosion of the floor of the middle fossa of the skull; the pituitary fossa and the sella turcica are destroyed." Lawford held that the growth was a median one; both optic nerves were involved almost simultaneously. ERNEST THOMSON.

(2) **Lafon**, of Perigueux, describes two cases of pituitary growths in women, in one of whom evidences of acromegaly were present, whereas they were absent from the other. He draws attention to a symptom, apparently hitherto undescribed, which was present in both his cases, *viz.*: a fugacious congestion of the bulbar conjunctiva. The discs showed some primary atrophy, and there

was bitemporal hemianopia, but in one case the latter was relative only, and a casual examiner would have regarded the fields as full. There was crossed diplopia aud nystagmus in one case. Symptoms pointing to increased intra-cranial tension were noted, and there was amenorrhoea and failure of sexual functions, and lack of physical and mental energy. Trophic disturbances of epithelial structures were observed in the skin, nails, teeth, etc. There was thyroid insufficiency and atrophy in both cases. One case improved markedly on thyro-ovarian medication. J. JAMESON EVANS.

(3) The case reported by **Levy**, of London, was in a youth of nineteen years whose right eye showed primary atrophy of the optic disc. The lad was slightly built, had no hair on his face, his penis and testicles were small, and he had never experienced erections or sexual tendencies. A skiagram showed great enlargement of the sella Turcica. The voice was comparatively high-pitched. Fatty prominences in mammary region.

SYDNEY STEPHENSON.

(4) **Evans**, of Birmingham, classifies the manifestations of pituitary tumours in the following way.—(1) hyperpituitarism; (2) hypopituitarism; (3) the mechanical effects of an intracranial tumour showing definite localising symptoms, which can be explained by the anatomical relationships of the enlarged organ; and (4) radiographic evidence of enlargement or atrophy of the hypophysis.

(1) *Hyperpituitarism.*—Acromegaly and gigantism are both included under this head, and while the underlying pathological processes appear to be the same, the difference in the clinical characters is dependent upon the period of incidence of the disease—"Gigantism is the acromegaly of the growing period; acromegaly is the gigantism of the period of completed development." Apart from the symptoms common in cases of intracranial tumour, the localising symptoms are mainly shown in connection with the eyes and the ocular muscles. There is impairment of sight in one or both eyes, and this may be associated with the appearance of a blue haze over everything. The failure of sight, as a rule, surely but slowly progresses to almost complete blindness. Among the commonest and most characteristic alterations in the visual fields we have bitemporal hemianopia. The temporal hemianopia is often unilateral, owing to complete loss of sight in one eye. The dividing line between the blind and the seeing parts is scarcely ever vertical or regular. When the boundary line is vertical or approximately vertical, it usually passes through the point of fixation, a fact that helps to distinguish chiasmal lesions from lesions of the optic tract and cortical centres, in which the macular field is spared. Other variations in the visual fields include concentric contraction and central scotoma. A clue as to the ultimate type the contraction will assume is often shown by the colour fields. It will frequently be found that the colour fields are definitely hemianopic, while the fields for white are almost full. In 50 per cent. of the cases there is primary atrophy of the optic disc; in 15 per cent. there is œdema; and in 15 per cent. there is post-neuritic atrophy. Large growths produce such symptoms as oculomotor paralysis, including paralysis of the third nerve, paralysis of the sixth nerve, total ophthalmoplegia, and nystagmus. Under similar circumstances, exophthalmos, prominence of the eyebrows, with pigmentation and thickening of the eyelids and hypertrophy of the palpebral glands, have been noted. Anosmia is not uncommon in advanced cases. The pupil reactions are of little diagnostic value.

(2) *Hypopituitarism.*—The chief members of this group include infantilism ("ateliosis" of Hastings Gilford), and cases where the excessive development

of fat coincides with mental and physical torpor and disturbance of the sexual functions (" dystrophia adiposo-genitalis " of Fröhlich). Ateliosis may begin during fœtal life, during infancy or early childhood or between the ages of infancy or early childhood and puberty. The patient manifests throughout life the physical characteristics of his age at the time when he first developed symptoms. The mental development is better than the physical, although somewhat below *par*. It seems that in hypopituitarism as compared with hyperpituitarism bitemporal hemianopia is somewhat less frequent, while papillary stasis and atrophy and oculomotor symptoms are more frequent. Nystagmus is very exceptional. Fröhlich's symptom-complex does not differ to any great extent from ateliosis, except that it may affect adults, and that excessive deposit of subcutaneous fat and somnolence are pronounced symptoms.

The details of several cases are appended to Evans' painstaking communication. SYDNEY STEPHENSON.

(5) Tumours of the hypophysis cerebri, in addition to the general symptoms of intra-cranial neoplasms, give rise to: (1) symptoms denoting an alteration in the glandular functions, and (2) symptoms connected with the anatomical position of the growth. Furthermore, in these cases the X-rays furnish us with an invaluable means of diagnosis.

Toupet, of Paris, reviews each of the foregoing elements of diagnosis:

1. Alterations in Function.

Changes in the hypophyseal functions include (a) acromegaly, (b) gigantism, and (c) Fröhlich's syndrome. (a) and (b) call for no special description, but (c) appears to be little known, at all events in France. It is characterised by adiposity, genital disturbances, and an hypophyseal tumour. In young subjects the genital disturbance manifests itself by infantilism and the absence of sexual characters, and in adult males by frigidity and in adult females by cessation of the menses. There may be a kind of inversion of the sexual characteristics. The adiposity, which is generalised, reminds one, as regards the feel of the parts, of the œdema found in myxœdema. It is not painful, as is the adiposity of Dercum's disease.

When one of these disease-types exists, may we conclude that a tumour of the hypophysis is present? In acromegaly and gigantism the answer must be in the affirmative. As regards Fröhlich's symptom-complex, the case is not quite so clear. Erdheim believes that the condition in question is due not to a lesion of the hypophysis but to a lesion of the hypophyseal region and, in particular, of the infundibulum of the third ventricle. But in most cases a tumour of the hypophysis is present.

2. Focal Symptoms.

The focal symptoms fall into two groups: (1) ocular disturbances, and (2) glycosuria.

(1) *Ocular disturbances.*—These include changes in the (*a*) visual fields, (*b*) sight, (*c*) ophthalmoscopic appearances, (*d*) pupils. (*a*) *Visual fields.*—Various changes are found in the fields of vision according to the particular parts of the optic tracts compressed or destroyed and the partial or total nature of the lesions. But the commonest sign is bitemporal hemianopsia, caused by the position of the tumour with reference to the chiasma. It is rarely pure. The changes in the field often pass undetected, since the macular fasciculus may remain intact. (*b*) *Visual acuity.*—Changes in sight are very common, and may vary from slight defect to complete blindness

According to Uhthoff, unilateral amaurosis is present in 33 per cent. of the cases and bilateral amaurosis in 16 per cent. Variations in sight are common, due, in Erdheim's opinion, to modifications in the volume of the tumour, especially when the latter is of cystic nature. The course of the amaurosis may be either slow or rapid. The slow cases are to be explained by the gradual compression of the nerve-fibres, so that they have time to adapt themselves to the changed conditions. (*c*) *Ophthalmoscopic appearances.*—Bartels gave the following figures dealing with forty cases :—50 per cent. simple atrophy ; 15 per cent. bilateral œdema ; 15 per cent. neuritis followed by atrophy ; and 20 per normal optic discs. (*d*) *Pupils.*—The pupillary reflexes are nearly always profoundly altered in accordance with the degree of amaurosis that exists. Wernicke's hemianopic pupillary reaction has sometimes been found when there was hemianopsia. Dejèrine believes that this reaction is characteristic of an interruption of the optic fibres lying between the chiasma and the corpora quadrigemina, and should form an integral and almost exclusive part of the syndrome of the hypophysary region. Finally, in Cushing's case, which was cured by hypophysectomy, there was extreme photophobia.

(2) *Glycosuria.*—Sugar in the urine is met with in from one-half to two-thirds of the cases of acromegaly (Pierre Marie). This form of diabetes is associated with polyuria and polyphagia. Most authors believe that the hypophyseal tumour is the cause of the glycosuria. Loeb maintains, however, that it is due to compression of the tuber cinereum, where he supposes a glycogenic centre to exist, and Caselli has obtained some experimental confirmation of this hypothesis.

Diagnostic radiography of tumours of the hypophysis.

In order that radiography may be of any service, it is necessary that the normal ray should pass as close as possible to the axis of the sella Turcica, and that the axis itself be rigorously perpendicular to the sensitive plate. Under these conditions, the sella Turcica is perfectly shown in profile ; the two anterior and the two posterior clinoid processes are respectively superimposed, the clivus (*lame quadrilatère*) presents at once, and the contour of the sella is marked by a clear and regular line. Tumours confined to begin with to the cavity of the sella speedily destroy certain points of the sella Turcica, and it is exceptionally only that they develop in a trice towards the encephalon. The floor of the sella Turcica is rapidly involved, the compact bone which constitutes it disappears, and the contour of the sella becomes clearer and more irregular when examined by radiography. The earliest changes, however, bear upon the posterior clinoid processes and the clivus, which are little by little eroded by the tumour and end by fracturing and disappearing more or less completely. In the majority of cases the tumour tends to herniate towards the sphenoidal sinus, eroding the pummel of the saddle, eroding and driving back the posterior wall of the sinus until it produces an excavation as big as a nut or even larger. When the tumour develops towards the base of the brain, the superior orifice of the sella Turcica becomes enlarged, although not after a constant fashion, and radiography is powerless to inform us as to the existence, the number, the volume, and the direction of the intracranial prolongations. There appears to be only one case on record where an hypophyseal tumour has itself been seen by radiography (Horsley). In cases of acromegaly, besides the lesions of the sella Turcica, the dilatations of the sinus, the unequal thickening of the bones of the skull, and the post-lambdoidal projection (*ressaut post-lambdoidien*) can be ascertained by the employment of the X-rays.

Treatment.

Left to themselves, tumours of the hypophysis lead eventually to death, after causing atrocious suffering and blinding the patient. Faced by cases of so desperate a nature, Toupet believes that any attempt at cure, however risky, is permissible.

Our resources include opotherapy, radiotherapy, and surgical measures. The first two may be very briefly dismissed. The results so far obtained from opotherapy are by no means encouraging. Irradiation by the buccal cavity (Gramegna) or by the fronto-temporal region (Béclère) have not been particularly successful. Surgical measures may be palliative or curative. The former include a decompressive operation or incision of the dura mater which envelops the neoplasm. The curative operation is known as "hypophysectomy," the first attempts at which were made by Caton and Paul in the year 1893. They proposed to operate in two stages by the temporal route, but they succeeded only in cutting the flap of the skull. Giordano was the first to approach the hypophysis by the trans-sphenoidal route by way of the nasal fossæ. In 1907 Schloffer performed the first hypophysectomy. Although a surgical success, the patient died two-and-a-half months after the operation from hydrocephalus, the tumour having grown beyond the limits of the sella Turcica and being inoperable. Since then, the operation has been performed many times ; so often indeed that Toupet has been able to collect 41 cases from the literature. Of these operations, two were performed by the intra-cranial route, and 39 by the extra-cranial route, for the most part by the nasal passages. The sole advantage of the intra-cranial route is to be found in the asepsis likely to be thereby secured. The trans-sphenoidal route is more exposed to the dangers of septic complications, although that danger must not be exaggerated. By this route the tumour is readily accessible ; the surgical shock is appreciably less ; and we run no risk of wounding the chiasma and the pituitary body. The trans-sphenoidal route is, then, the *procédé de choix*. There are several ways of reaching the sphenoidal sinus, but two methods alone need be mentioned, namely, the nasal route and the endonasal route. The former has been generally followed, but Hirsch has performed nine operations on the hypophysis by the latter. The nasal route, however, is preferable.

The results of Hypophysectomy.—Toupet goes into this matter with much care, and, as the result of his enquiries, concludes that the therapeutic results of the operation are surprising. After its successful performance, headache is much improved or disappears completely, while disturbances of sight are ameliorated, although to a less extent, since these lesions are often definitive. Upon the symptoms of acromegaly or the syndrome of Fröhlich the operation has a most marked influence. The deformities of acromegaly show signs of regression five or six days after operation. The face, the feet, and the hands, appear to be almost normal, and the menses re-appear. In cases of Fröhlich's symptom-complex, the adiposity diminishes, erections make their appearance, bald men develop hair, and abnormal hairiness disappears from women. These results are not ephemeral. The surgical results, then, of hypophysectomy are now of a very encouraging nature, and they will doubtless become even better when the tumours are operated on earlier, and when surgeons acquire more experience in *technique*. The mortality after operation, however, is as yet very serious. For example, it amounted to 38·9 per cent. among thirty-nine extracranial hypophysectomies. It was greater (40·6 per cent.) in thirty-two operations by the nasal route than in seven by the endo-nasal route (28·5 per cent.) As regards the results obtained by individual surgeons, von Eiselsberg had four deaths in twelve hypophysectomies (33 per cent.); Hochenegg one death in four operations (25 per cent.); and Hirsch, who adopted the endo-nasal route, two deaths in seven operations (28·5 per cent.) The three surgeons named have among them peformed more than half of the total number of operations undertaken for hypophyseal tumours. The figures, therefore, are instructive.

Toupet advises that hypophysectomy by the nasal route be performed as soon as the diagnosis is made, provided always that examination by the x-rays shows that the sella Turcica is enlarged towards the sphenoidal sinus.

SYDNEY STEPHENSON.

VIII.—CONICAL CORNEA.

(1) **Maddox, E. E.—An operation for conical cornea.** *Ophth. Review*, February, 1912.

(2) **Le Fever, C. W.—Keratoconus: Report of a case.** *Ophthalmic Record*, February, 1912.

(3) **Cooke, Arthur.—Case of ectasia following conical cornea; excision of elliptical portion.** *Trans. Ophth. Soc. U.K.*, Vol. XXXII, Fasc. 2, p. 194, 1912.

(4) **Worth, Claud.—Operative treatment of conical cornea.** *Trans Ophth. Soc. U.K.*, Vol. XXXII, Fasc. 2, p. 205, 1912.

(1) In this operation, **Maddox**, of Bournemouth, protects the wound in the cornea by suturing a tongue of conjunctiva across it. He does it as follows.—After the removal of the ellipse of corneal tissue in the usual way, he brings the lips of the wound together with a fine suture passing through the outer half of the substantia propria, he then detaches a broad tongue of conjunctiva from the lower part of the globe, and draws it up across the cornea nearly to the upper limbus, keeping it in place by suture; the long tongue is also fixed laterally by very fine silk at the level of the excised cornea. The upper suture holds for a week, and in the meanwhile the corneal wound heals well.

A. H. PAYAN DAWNAY.

(2) **Le Fever**, of Philadelphia, reports the case of a man, aged fifty years, who developed keratoconus about the age of thirty. In 1899, the glasses worn were:—R.E., 1 cyl. axis 90°; L.E., 1·75 cyl. axis 90°, and since then they had to be changed at varying intervals of two years and less, and in 1908 he wore

R. + 2 sph. c.—12 cyl. axis 100° = 20/40 not improved
L —17 sph. c. + 32 cyl. axis 10° = 20/20

With the use of myotics and the addition of a + 3 sph., his near vision was normal. The distended area of the cornea was not conical, but more like a hanging drop of viscid liquid, and the point of greatest projection was considerably below the centre of the cornea.

The grinding of the lens in the left eye demanded a special tool. The lens was 14 mm. thick in the centre and had to be specially mounted to give it proper support.

J. JAMESON EVANS.

(3) **Cooke,** of Cambridge, reports one of those rare and curious cases where a sudden exacerbation occurs in the course of the history of conical cornea. Such a condition, which is believed to be due to rupture of Descemet's membrane, has been mentioned by W. A. Brailey (1875), Pflüger (1877),

Terrien (1906), and Rabinowitsch (1908), respectively. The facts of Cooke's case follow.—A man, aged 28 years, was known to have suffered from conical cornea since October, 1908, when his sight was less than 6/60. At the beginning of the following January, the patient, whilst washing, felt "something give way" in the left eye, and a kind of bleb appeared immediately afterwards. When examined by Cooke a fortnight after this event, the lower two-thirds of the left cornea were seen to be occupied by a hemispherical ectasia. It was greyish-white and opaque, about 7mm. in diameter, and prevented complete closure of the eyelids. The conjunctiva was reddened, and the eye was irritable. V.=p.l. Seventy-eight days after excision of an elliptical portion, the corrected vision of the eye was 6/12, and according to the latest note, made upwards of three years after operation, it was 6/18. SYDNEY STEPHENSON.

(4) **Worth**, of London, has operated upon six eyes in four patients for conical cornea by the following method.—By means of a platinum thermocautery, applied at a dull-red heat, one burns a deep trench in the cornea, the long axis of which lies at right angles to the meridian of greatest curvature. By these means a gutter, about 4 mm. long by 2 mm. wide, extending almost to Descemet's membrane, is made. Care must be taken to avoid opening the anterior chamber. The last step is to tap the chamber at its periphery by means of a broad needle, and to keep it open until such time as the ulcer is healed.

Discussion.

Wray, of London and Croydon, challenged Worth's statement that high *minus* cylinders were often required for the correction of astigmatism in cases of keratoconus. In his experience, a cylinder of the opposite denomination, its axis ranging from 5° to 30°, was generally needed. The more he saw of conical cornea the more he felt inclined to operate earlier, especially as well devised operations with the cautery seemed to be both satisfactory and free from danger. Other points were the constant use of glasses, and the avoidance of opening the eyelids widely.

Sir Anderson Critchett, of London, alluded to the risks incidental to removing an ellipse of cornea for the relief of keratoconus. He agreed with Worth in believing that the cornea should not be perforated with the cautery.

Lawson, of London, maintained that there was not much risk in perforating the cornea with the cautery. He thought the danger had been exaggerated. At the same time he had seen glaucoma follow the operation; but the eye (he thought) had done well after iridectomy had been performed.

Butler, of Leamington Spa, in operating for keratoconus, did not now perforate the cornea. SYDNEY STEPHENSON.

IX.—PATHOLOGY.

(*Fourth Notice.*)

(1) **Adam, C.—Researches upon the pathology of pemphigus of the conjunctiva. (Untersuchungen zur Pathologie des Pemphigus Conjunctivæ.)** *Zeitschrift für Augenheilkunde*, Januar, 1910.

(2) **Hesse, R.—On hyaline bodies in the choroid and senile changes in the macula. (Ueber Drusen der Chorioidea und senile Macula-veränderungen.)** *Zeitschrift für Augenheilkunde*, September, 1910.

(3) Seefelder, R.—The anatomical examination of a case of congenital ectopia of the pupil with dislocation of the lens. (Anatomischer Befund in einem Fall von angeborener Ektopie der Pupille mit Linsenluxation.) *Zeitschrift für Augenheilkunde*, April, 1911.

(4) Passera, E.—A contribution to the study of marginal degeneration of the cornea. (Contributo clinico allo studio della degenerazione marginale dello cornea.) *Giornale di Medicina Militare*, 1911, Fasc. iv

(5) Alt, Adolf.—On a case of partly pigmented spindle cell sarcoma of the iris: Proliferating choroiditis and microscopical hole in the fovea centralis. *American Journal of Ophthalmology*, June, 1911.

(6) Welton, Carroll B.—A case of sympathetic ophthalmia, first appearing four days after removal of the exciting eye, with histological report. *Archives of Ophthalmology*, July, 1911.

(7) Coats, George.—Exudative retinitis. *Ophth. Review*, October, 1911.

(8) Miller, G. Victor.—A case of tuberculous disease of the eyeball? *Brit. Med. Journal*, November 18th, 1911.

(9) Levinsohn.—Experimental researches upon the pathogenesis of choked disc. (Experimentelle Unterschungen zur Pathogenese der Stauungspapille.) *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1911, p. 264 (Volume published in 1912).

(10) Kuffler.—Endothelioma of the orbit. (Endotheliom der Orbita.) *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1911, p. 275 (Volume published in 1912).

(11) Junius.—On the ætiology of trachoma. (Zur Aetiologie des Trachoms.) *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1911, p. 223 (Volume published in 1912).

(12) Stargardt, K.—On diseases of the eyes in general paralysis. (Ueber Erkrankungen des Auges bei progressiver Paralyse.) *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1911 (Volume published in 1912).

(13) Deutschmann, F.—The plasmomata, the hyaline, and the amyloid degeneration of the conjunctiva. (Das Plasmom, die hyaline und die amyloide Degeneration der Konjunktiva.) *Zeitschrift für Augenheilkunde*, März, 1912.

(1) **Adam's** patient, who had severe shrinking of the conjunctiva, the result of pemphigus, ultimately died from perforation of the œsophagus which followed pemphigus of that structure. A full account, illustrated by two coloured plates, is given of the histological pathology of the eye examined. T. HARRISON BUTLER.

(2) This paper by **Hesse**, of Graz, is illustrated by photographs of the fundus taken by Dimmer's well-known apparatus. The first two figures show hyaline bodies (*Drusen*) grouped round the macula. The third figure shows the changes which had taken place at the macula of the right eye three years later. Here we have massive senile degeneration and a large hæmorrhage. The author suggests that these *Drusen* may not be so harmless as has been supposed. At first the macula was surrounded by a circle of white spots which were regarded as hyaline bodies. V.=0.4. The question arises, were

these white spots really harmless *Drusen*? Judging by the photographs alone, they suggest a form of senile change which we have frequently found associated with very poor central vision. T. HARRISON BUTLER.

(3) This purely histological paper by **Seefelder**, of Leipzig, is of little general interest, and unsuitable for abstraction. T. HARRISON BUTLER.

(4) **Passera** records very fully the case of a man of sixty-seven, whose right eye showed marked changes resulting in slight marginal ectasia below, and slight thinning with excavation above. There was also a pterygium at the nasal side and a less well-marked formation of similar nature at the temporal margin. The changes were essentially chronic in character, and Passera shows that they are closely allied to those formed in the arcus senilis. There is fatty degeneration of the tissue of the cornea and ultimate absorption, with replacement by fibrous tissue. This may, and usually does, result, in a loss in the total thickness of the cornea, with consequent formation of a marginal gutter. If the newly-formed tissue is unable, however, to withstand the intra-ocular pressure, slight ectasia may take place.

LESLIE BUCHANAN.

(5) The case reported by **Alt**, of St. Louis, should be read in the original.

(6) In **Welton's** case, enucleation of the injured eye was refused until the thirtieth day. Vision in the other eye was then normal, and there was no sign of irritation. On the fourth day after the operation, sympathetic ophthalmia set in, as evidenced by iritis, and the presence of many nodes of a whitish-yellow colour in the choroid at a distance from the disc, round in shape, some large and some small, and lying under the retinal vessels. Vision = 20/40. Placed upon doses of 80 grains a day of sodium salicylate, continued for forty-three days, the eye became quiet, and eventually vision was completely restored. The enucleated eye, examined by Dr. Brown Pusey, showed the proliferative uveitis characteristic of an injured eye leading to sympathetic ophthalmia.

Welton tabulates twenty-seven other cases of post-operative sympathetic ophthalmia taken from the literature. Taking these and his own case, the shortest interval between injury and enucleation was nine days, and the longest two months; in sixteen cases the period was within a month. The shortest time between enucleation and the onset of the sympathetic ophthalmia was two days, and in twenty-seven cases the onset was within a month; eleven cases developed during the first week. Of the twenty-seven cases in which final visual reports are given, sixteen, *i.e.*, 59 per cent., recovered with normal vision; in seven cases vision was lessened; and in four lost. This good result indicates, thinks the author, the value of enucleation at any time, as making the disease milder, even if it does not altogether prevent it. Only a few of these cases had been histologically proved to be sympathetic disease, but, in a number of them, the definite picture of proliferative uveitis indicated sympathetic ophthalmia. The author concludes that enucleation should not be delayed after the receipt of an injury likely to produce the disease. Since the removal of the exciting eye is not sufficient to prevent an outbreak of sympathetic ophthalmia, Welton thinks that the poison is carried by means of the general circulation, and not merely directly from eye to eye. ROSA FORD.

(7) This paper, by **Coats**, of London, gives an account of a case of exudative retinitis in a male, aged twenty-nine years, observed over a period of sixteen years. Exudation and hæmorrhage appear and disappear, to be followed by similar occurrences in other parts of the fundus. The eye ultimately became degenerate, and retinal detachment, posterior cortical cataract, band opacity, and diminished tension resulted. Examination of

these cases has shown that the condition is hæmorrhagic in origin, affecting chiefly the capillary circulation, the extravasation occurring in the outer layers of the retina (see *Royal Lond. Ophth. Hosp. Rep.*, 1908).

A. H. PAYAN DAWNAY.

(8) **Miller**, of Stockton, after removal of the eyeball from a woman, twenty-one years of age, found a tuberculous abscess, together with a caseous nodule, in the anterior part of the sclera. The vitreous was full of cholesterine. The eyeball had been inflamed for some five years before it was enucleated. SYDNEY STEPHENSON.

(9) Five years ago **Levinsohn**, Berlin, read a paper before the Heidelberg Congress in which he maintained that choked disc commenced in the perivascular lymph spaces of the central vessels within the vaginal space, because the increased pressure in the vaginal space blocked the outflow from the eye, and so gave rise to "choking" of the disc. Schieck, who has recently confirmed this view, thinks that the cerebro-spinal fluid is normal in these cases, whereas Levinsohn regarded it as pathologically modified. In a later publication he taught that the liquor passed from the intervaginal space into the preformed lymph sheaths of the axial bundle, and then along the central vessels forward to the papilla. Levinsohn considers this mechanism extremely improbable. In order to determine the behaviour of the fluid circulating in the sheath relative to the axial bundle during increased intra-cranial pressure, Levinsohn has made fresh experiments upon a cat, five dogs, and a monkey. Oil and stained saline solution were injected into the subdural space and the papilla was observed with the ophthalmoscope and later on examined by serial sections. The oil injection caused little swelling of the disc. Microscopically, only slight œdema of the anterior part of the nerve was seen. Some inflammation of the nerve sheath, and especially of the arachnoid, was present.

Injection of coloured salt solution in low amount and under high pressure very slowly caused slight swelling of the disc with venous hyperæmia and retinal hæmorrhages. Microscopical examination showed that the colouring matter collected in the subdural space. Evidence was seen that some of the colouring matter had reached the outlet of the central vessels by way of the subarachnoid and vaginal spaces. In no case was any found within the axial bundle. This evidence does not support Schieck's theory. The fact that in the monkey numerous retinal hæmorrhages with but little or no papillitis caused by compression of the central vein within the dura shows that the view advanced by Deyl and Knafe, that choked disc is caused by compression of the central vein within the vaginal space, is incorrect.

Schieck agreed with Levinsohn that it was impossible to force injection masses through the filter-like tissues of the perivascular lymph sheaths; only liquor cerebro-spinalis or salt solution could pass. He had, however, succeeded in injecting the perivascular lymph sheaths of the axial bundle with emulsions of chrome yellow, and he thought this positive success was of more value than Levinsohn's failures, which were not sufficient to invalidate his theory. T. HARRISON BUTLER.

(10) This communication by **Kuffler**, of Giessen, first summaries the somewhat meagre literature relating to endothelioma of the orbit, then gives a short clinical history of a case, and, finally, describes its histology.

T. HARRISON BUTLER.

(11) **Junius,** of Cologne, has for some years carried out researches upon the cells found in trachomatous conjunctivæ.

The present paper is an abstract of one read to the Congress and does not lend itself to further condensation; in fact, apart from the plates, it would be unintelligible. The standpoint taken by the author is that the solution of the trachoma question must be sought not in the epithelium but in the granulum.

T. HARRISON BUTLER.

(12) **Stargardt**, of Kiel, has examined the chiasma, the external geniculate body, the optic nerves, and the retinæ in fourteen cases of general paralysis and tabes. He has come to conclusions regarding the histological characteristics of the disease which are at variance with those usually accepted.

The conditions found in the two diseases, tabes and general paralysis, were identical except in so far as in tabes the process was more fully developed. Broadly speaking, in general paralysis an early stage of degeneration was present, in tabes a late or final stage. A complete chronological picture can only be obtained by examining several cases and comparing the results. The first abnormality is found in the chiasma, and consists of proliferation of the glial elements surrounding the chiasma. Isolated plasma cells appear in the pia mater. These appearances are found very early in the disease, and Stargardt has never failed to detect them. The infiltration increases and small foci of cells appear, until finally both chiasma and the intracranial optic nerve are surrounded by a sheath of cells. The cells are mostly plasma cells, with a few mast cells. Leucocytes are infrequent. The infiltration is bounded by the arachnoid. Hand in hand with this infiltration, there is a proliferation of the glial fibres. At this epoch no changes can be detected in optic nerve or retina. The next stage is a spread of the infiltration into the vessel sheaths of the chiasma and intracranial optic nerve. At last the nervous elements of the chiasma begin to suffer, first the medullæ and then the axis cylinders. The destruction of nerves is not confined to special tracts, but is a diffuse process through the entire chiasma. As soon as definite signs of degeneration appear in the chiasma, alterations commence in the optic nerve and cell degeneration in the retinæ. The change in the retinæ is diffuse, and must be regarded as secondary in nature. In the lateral geniculate body changes appear which are partly primary and partly secondary to the chiasma disease. To summarise: the simple optic atrophy in general paralysis and tabes is an exceedingly chronic inflammation which takes place in the chiasma and spreads inwards along the lymphatics and blood vessels. It is not the result of the general action upon the nerve of a specific toxine. The author compares the disease with sleeping sickness, and states that the pathological anatomical picture is almost identical. Now, in this disease, Stargardt has proved that where infiltration is present there also are trypanosomes to be found. He reasons from analogy that the chiasma disease is caused by the actual presence of the spirochæta pallida. These have actually been detected by Strassmann in cerebral syphilis. It is a matter of common knowledge that they are present in syphilitic interstitial keratitis. T. HARRISON BUTLER.

(13) **F. Deutschmann**, of Hamburg, gives an account of a conjunctival growth which consisted entirely of plasma cells. The condition was first described by Pascheff and later by Rund. There appears to be a tendency for hyaline and amyloid degeneration to develop in the later stages. Deutschmann discusses the question whether the tumours should be regarded as inflammations or new growths, and decides that they are new growths.

T. HARRISON BUTLER.

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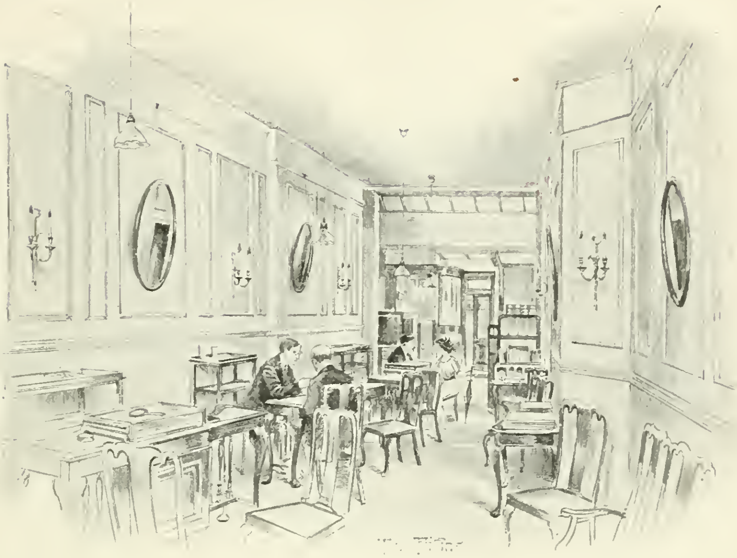

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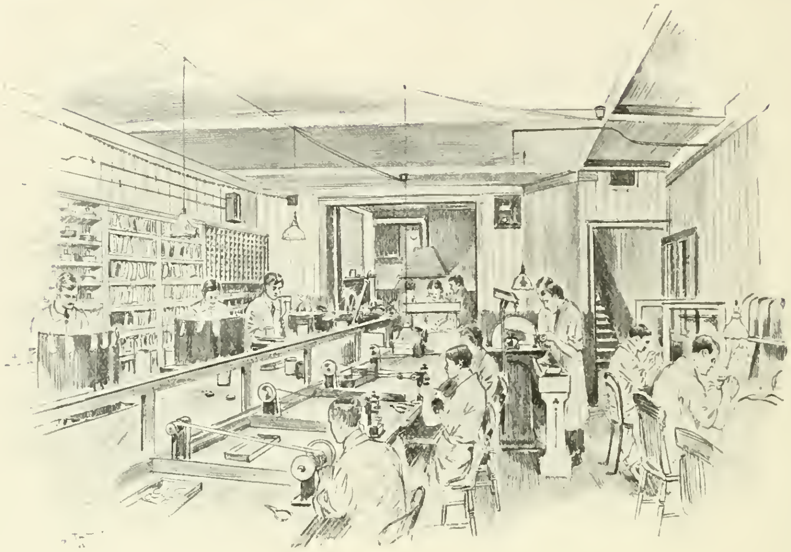

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X.—OPERATIONS FOR GLAUCOMA.

(1) **Borthen, L.**—The operative treatment of glaucoma by iridotasis. *Archives of Ophthalmology*, July, 1911.
(2) **Bettremieux.**—Iridectomy and sclerectomy in glaucoma. (Iridectomie et sclérectomie dans le glaucome.) *La Clinique Ophtalmologique*, 10 août, 1911.
(3) **Bradburne, A. A.**—Note on a case of trephining in acute glaucoma. *Lancet*, 9th December, 1911.
(4) **Bettremieux.**—Curative and preventative sclerectomy in glaucoma. (La sclérectomie curative et préventive du glaucome.) *Ann. d'Oculistique*, janvier, 1912.
(5) **Lezenius, A.**—Optico-ciliary neurectomy by Golowin's method in absolute glaucoma. (Ueber die Neurectomia optico-ciliaris nach Golowin bei absolutem Glaukom.) *Klin. Monatsbl. f. Augenheilk.*, April, 1912.
(6) **Dor, Louis.**—The new glaucoma operations. (Les nouvelles opérations antiglaucomateuses.) *La Clinique Ophtalmologique*, 10 mai, 1912.
(7) **Lagrange.**—Anterior perforating sclerectomy for affections other than glaucoma. (La sclérectomie antérieure perforante pour les affections autres que le glaucome.) *Archives d'Ophtalmologie*, juin, 1912.
(8) **MacNab, Angus.**—A lecture on glaucoma. *The Polyclinic*, July, 1912.

(1) **Borthen**, of Trondhjem, Norway, tried Holth's method of iridencleisis in twenty-five cases, with eight cures, nine failures, and eight cases that could not be followed up. He has since modified Holth's operation, in that he does not incise the iris, but merely pulls it through a sclero-corneal incision, 4 to 5 mm. long and 1 mm. wide, behind the sclero-corneal margin. A fold of the iris, 1 to 2 mm. wide, is taken up, including the sphincter, and left in the scleral wound, care being taken not to exercise too much traction lest the pupil be pulled too much upwards and sight be thus interfered with. Previous to the sclero-corneal incision, a conjunctival flap is formed, including as much subconjunctival tissue as possible. This is begun 10 mm. back of the upper limbus and is 2 to 3 mm. wide. Care must be taken not to fenestrate this, as that would make the operation useless. A drop of atropine should be instilled ten minutes before operation, in order to insure that the iris remains in the wound; this does not cause increased tension. In fifty cases operated upon in this way by Borthen there was no failure among cases of simple or of absolute glaucoma. With the exception of four cases of advanced chronic inflammatory glaucoma, tension was invariably reduced to normal or below, generally immediately after the operation. Tension remained low during the entire period of observation, which amounted in several cases to almost a year. In five cases, unimproved by iridectomy, tension became normal directly after iridotasis, and the same was the result in seven cases of failure after Holth's operation. In three cases of chronic inflammatory glaucoma, operated on at an early stage, satisfactory results were obtained. Borthen had no case of infection after operation in either his cases of iridencleisis or iridotasis. Later, Borthen added another 47 cases to the 50 formerly mentioned, and, of the whole 97, 33 have been watched for from 1¾ to 2 years or more. All these cases were cured with the exception of two cases of chronic inflammatory glaucoma with normal tension. Borthen thinks that probably the reason for such unusual success lies less in the communication between the anterior chamber

and the subconjunctival lymph spaces than in the stretching of the iris which makes filtration through the spaces of Fontana possible again. The iris in this operation shows the fibres drawn out in the direction of the prolapse, and the contraction furrows smoothed out. In those cases where success was not obtained, the cause may have been that there was atrophy of the iris, with accompanying permanent obliteration of the iris angle and atrophic changes in the stroma iridis. In old people with rigid irides, the scleral section should be longer—8 mm. ROSA FORD.

(2) **Bettremieux**, of Roubaix, once more emphasizes the value of pericorneal non-perforating sclerectomy, and insists on its superiority over other operations which make a large opening in the glaucomatous eye.

ERNEST THOMSON.

(4) **Bettremieux**, of Roubaix, again urges the value of non-perforating anterior sclerectomy in the treatment of glaucoma, and expresses the opinion that when one eye is glaucomatous, this operation should be performed as a preventive measure on the other eye, even if it shows no sign of the disease. He gives as his reasons for this advice the facts that glaucoma is almost always binocular, although it does not necessarily attack the two eyes simultaneously and that when once established, it may be checked, but cannot be cured. He gives notes of a case in which he put this principle into practice. R. J. COULTER.

(5) **Lezenius.**—There are cases in which the loss of an eye may mean the abandonment of a career, in addition to the discomfort and trouble attaching to the wearing of an artificial eye. Optico-ciliary neurectomy finds its field of usefulness in those cases where it is desirable to retain an eyeball, while something must be done for the relief of pain. More particularly does this apply to absolute glaucoma, in which such operations as iridectomy, sclerotomy, and cyclo-dialysis, fail to give freedom from pain, and enucleation seems the only alternative. One drawback of optico-ciliary neurectomy is the tendency to retro-ocular hæmorrhage, which, however, is said to be absent in Golowin's method. After external canthotomy has been done, the conjunctiva bulbi is incised at the outer side of the cornea and dissected up as for advancement. The tendon of the external rectus is divided. The eye is pulled forward by means of Welz's enucleation spoon, and the nerve gripped some distance further back by Koeberlé's forceps. The nerve is then divided in front of the forceps, the eye rotated forward, and the nerve cut off close to the sclera. The divided muscle is not reunited, as there is a tendency to divergent squint. There is at first slight exophthalmos, but this soon disappears. Complete mobility is established in a few weeks. Bulbar injection persists for a long time. A. J. BALLANTYNE.

(6) The review by **Dor fils**, of Lyons, is not long and is by no means exhaustive. It is interesting all the same in the amount of credit which is given to British surgeons in the campaign against glaucoma. In the final paragraphs the author reminds us that, do what we will, whether iridectomy, sclerectomy, trephining, cyclodialysis, or other rational operation, there will sometimes be post-operative complications. If one has the misfortune to see an acute post-operative glaucoma one should think immediately of posterior sclerotomy. One must obtain a large immediate decompression. It is no use wasting time with eserine or making larger iridectomies. It is as urgent to do an equatorial sclerotomy as to divide the rope around the neck of a hanging man. If a large incision is made, no matter whether the vitreous prolapses, decompression is assured for several days. More especially the author recommends posterior sclerotomy *à l'emporte-pièce* or by means of the trephine. ERNEST THOMSON.

(7) In a communication, read at the French Society of Ophthalmology this year, **Lagrange**, of Bordeaux, records in detail the value of his operation in seven cases where hypertension existed, due to causes other than primary glaucoma. They comprise three cases of congenital buphthalmos, and one each of anterior staphyloma, keratoglobus, keratoconus, and hypertension secondary to cataract extraction respectively. The operation was successful in all save one, namely, the case of buphthalmos, in which vitreous was lost from excessive pressure being exercised by an assistant during the operation, phthisis bulbi resulting.

The author takes the opportunity to protest amicably, although emphatically, against the manner in which his method and operation for fistulisation of the globe have been passed in silence by those who have " imitated the former and realised the latter in every respect."

Referring to a recent article by Elliot, in which are recorded seventeen cases of hypertension, properly speaking non-glaucomatous, which were relieved by trephining, Lagrange writes, " Elliot has performed my operation, for I think it my duty to rise up against the pretention not only of Elliot but of a large number of English authors who are giving their names to modifications, often unsuccessful moreover, in the method of performing sclerectomy, and I desire that it be understood above all that every surgeon who makes an anterior scleral resection beneath the conjunctiva performs the operation of Lagrange. I also take the opportunity of saying that of all the modifications of my *technique* and instrumentation which have been made, the one which is successful is that of Holth, who has advised the modified Vacher punch-forceps. This is an excellent instrument, and I very often make use of it. The trephine is a very inferior means, for it removes a circular scleral fragment instead of one elongated in the line of the angle of infiltration; nevertheless, one can evidently make a sub-conjunctival fistulisation with it and consequently realise my operation, and quite naturally I find that Fergus, who first conceived it, and after him Elliot and a number of imitators, continue to make use of it. Fergus trephines opposite the ciliary body and finishes the operation by cyclo-dialysis ; he thus performs the operation of Lagrange and Heine combined. Elliot practises scleral trephining close to the anterior chamber; he simply performs Lagrange's operation, and it seems necessary to me to here point this out. The necessity of clearly establishing the question of priority never appeared to me more evident than after reading THE OPHTHALMOSCOPE of May, 1912. Elliot there writes an article ' on his operation,' without making any allusion to mine ; Temple Smith publishes a memoir on the site of trephining in glaucoma, and concludes in favour of Elliot's trephine, without mentioning that the necessity of placing the resection close to the anterior chamber in the region of Schlemm's canal has been from the very first and in every case explicitly put forward in my work. George Young also by his method performs sclerectomy close to the anterior chamber sub-conjunctivally, *i.e.*, my sclerectomy. He removes two discs instead of one, and that constitutes his operation," etc.

Lagrange first performed his operation in 1903, and published his first results in 1905. BERNARD CRIDLAND.

(8) In the course of a lucid lecture, **MacNab**, of London, dwells upon the advances recently made in the surgical treatment of chronic glaucoma, and in doing so, eulogises the part played in the process by H. Herbert, late of Bombay, and R. H. Elliot, now of Madras. By the efforts of those surgeons the disease in question has been changed " from a gloomy terror to an amenable, well-conducted pathological condition, which it is rather a pleasure to handle.' By different methods of operation both Herbert and Elliott have

managed to form a track permeable to fluid between the anterior chamber, on the one side, and the lymph spaces that lie beneath the conjunctiva and the sclera, on the other. Herbert accomplishes this end by making a small flap in the sclera, like a trap-door, which, when healed, leaves a permeable cicatrix. Elliot, as well known, obtains a similar result by boring a hole with a cutting trephine through the sclero-corneal junction into the anterior chamber. Iridectomy forms no integral part of either operation, although circumstances may render its performance desirable. MacNab believes that in the two operations we have "two eminently efficient and ready methods of preventing the dire effects of chronic glaucoma." He is not prepared to say which is the better operation. SYDNEY STEPHENSON.

XI.—REMEDIES.

(*Seventh Notice.*)

(1) **Morax and Fourrière.—"606" in glaucoma of syphilitics. (Effets hypotonisants du "606" dans le glaucome chez des syphilitiques.)** *Recueil d'Ophtalmologie*, juillet, 1911.

(2) **Darier, A.—The treatment of amaurosis due to retinal ischæmia. (Traitement des amauroses par ischémie rétinienne.)** *La Clinique Ophtalmologique*, 10 octobre and 10 novembre, 1911.

(3) **Garipuy, Edmond.—Salvarsan and the optic nerve. (Le "606" et le nerf optique.)** *L'Ophtalmologie Provinciale*, décembre, 1911.

(4) **Weill, G.—Atropine eczema. (Ueber Atropinekzem.)** *Klin. Monatsbl. f. Augenheilk.*, April, 1912.

(5) **Zahn, Erwin.—The application of diathermy to the eye. (Ueber die Anwendung der Diathermie am Auge.)** *Klin. Monatsbl. f. Augenheilk.*, April, 1912.

(6) **Rollet and Genet.—Syphilitic chancre of the eyelid and of the chin. (Chancre syphilitique de la paupière et du menton.)** *Revue Générale d'Ophtalmologie*, 30 avril, 1912.

(7) **McNeil, R. P., Robb, R. M., and Moll, A. M.—A case of optic atrophy from "606."** *Transvaal Medical Journal*, May, 1912.

(8) **Morten, Edward Reginald.—The treatment of rodent ulcer.** *Lancet*, 18th May, 1912.

(9) **Rohmer.—The effect of injections of sterilised air into the vitreous in detachment of the retina. (Effets des injections d'air stérilisé dans le vitré contre le décollement de la rétine.)** *Archives d'Ophtalmologie*, mai, 1912.

(10) **Olsho, Sidney L.—Untoward effects of Salvarsan referable to the eye and ear.** *Therapeutic Gazette*, 15th June, 1912.

(11) **Reese, Robert G.—Effects of Salvarsan on the eye.** *New York State Journal of Medicine*, July, 1912.

(1) **Morax and Fourrière**, of Paris, report three very interesting observations in which they noted a marked and persistent reduction of tension in glaucoma secondary to iridociliary or choroidoretinal syphilitic lesions after the injection of "606." In one case tension had continued to increase even after a Lagrange sclerecto-iridectomy and the use of myotics, but was permanently reduced after the injection of "606." The other two cases were in young men of 22 years of age who suffered from secondary glaucoma from iridocyclitis and in one of whom there had been hæmorrhages into the vitreous previously. After failure by operation and myotics, Salvarsan injections produced a permanent reduction of tension. J. JAMESON EVANS.

(2) Two remedies stand out above and beyond all others in the treatment of amaurosis or amblyopia from retinal ischæmia, says **Darier**, of Paris. These are:—1st, the retro-bulbar injection of strong mercurials; and, 2nd, the operation of iridectomy. SYDNEY STEPHENSON.

(3) **Garipuy**, of Toulouse, cites two cases in support of his claim that, as far as the optic nerve is concerned, "606" is innocuous. He holds that it is permissible to suppose that the optic nerve will maintain its integrity, because the improvement of the visual acuity and the restoration of the field of vision are not compatible with the progress of the neuritis towards atrophy. The writer states that, unlike atoxyl, arsacetin, and perhaps hectin, Salvarsan will not injure an inflamed optic nerve; he quotes a number of authorities to support his statements. The cases of neuritis discovered after the administration of "606," if the neuritis were not there previously, can be put down to the original disease. Two cases by Schanz are referred to, in which the neuritis was cured by a further injection of "606." He urges the continuance of mercurial treatment to avoid relapses. Cases have been recorded of successful treatment by Salvarsan of atrophy of the optic nerve; Garipuy is, however, inclined to be sceptical as to this point until further proof is obtained. P. A. HARRY.

(4) **Weill**, of Strassburg, has seen six or eight cases in which, after more or less prolonged use of 0·5-1 per cent. atropine ointment, there was sudden onset of weeping eczema of the lids, cheek, and nose. By varying the method of application, he proved that the affection was due to the alkaloid and not to the vaseline or to free acid. He considers the occurrence due to an inherited supersensitiveness to the drug. It is to be noted that the eruption does not, as a rule, come on with the first application of the drug, as one would expect if it were a case of idiosyncracy. In some patients, however, who have suffered from an attack, he finds that he can set up the condition again by a single application, and in others a local eczema can be set up by rubbing a little of the ointment into the skin of the arm. The author puts this down to "anaphylaxis." A. J. BALLANTYNE.

(5) It has been shown that heat applied to the eye by means of compresses does not penetrate well to the deeper structures, because the tissues are bad heat conductors. **Zahn**, of Tübingen, describes a series of experiments designed to determine the efficacy of diathermy as a means of carrying heat to the intraocular and intraorbital structures. High frequency electric currents are employed, and heat is generated by the resistance which the current encounters in its passage through the tissues. It is believed that no other effects are produced. The advantages of diathermy over fomentations are that the temperature can be more easily regulated, and that there is a greater similarity between the temperatures in the cornea, vitreous, and orbit. In experiments on the rabbit it was found that the temperature in the conjunctival sac could be repeatedly raised to 42°C. without injury to the eye, but that a temperature above 45°C., even for a few minutes, gave evidence of pain and led to injection of the eyeball, myosis, and corneal opacity. In applying the process to the human eye, a layer of cotton wool 1 cm. thick, soaked in 2% sodium chloride solution, is closely and evenly applied to the outside of the lids. On this is applied an electrode 15 square cm. in size, while a large indifferent electrode is applied to the back of the neck. In a series of experiments the average rise of temperature in the conjunctival sac was 4·2°C. (to 40·6°), against an average rise of 1·64°C. (to 37·4°) produced by fomentations. A temperature of 39°C. in the conjunctival sac was described by the patient as comfortably warm. A. J. BALLANTYNE.

(6) **Rollet and Genet**, of Lyons, relate and discuss an unusual case

of double facial chancre. The sites affected were the lower eyelid and chin. The mucous membranes of the eye and mouth respectively were not affected. The case was treated by rectal injections of arsenobenzol, '606.'

ERNEST THOMSON.

(7) This inconclusive case is given in the authors' own words below :—

"On the 26th January, 1912, Mr. S. (31) called on us complaining of sores on his penis. The glands in his groin were enlarged and somewhat indurated. On the 13th February two of us injected intramuscularly ·6 grammes of Salvarsan. Very little local pain resulted. The following day a slight rash made its appearance. Within a fortnight the sores had completely healed. He was put on ½ gr. doses of hydr. cum creta t.i.d. After a month he complained of severe neuralgic pains in his jaws and right brow, which made him stop the mercury of his own accord. He called on us on the 19th April, saying he was blind in the right eye and that his left was not so strong as formerly. The pain meanwhile was severe over his right brow. He was sent to Johannesburg on the 20th, where optic atrophy in the right eye was confirmed. Although he complained of some weakness in the left eye, no definite sign of atrophy could be detected here." SYDNEY STEPHENSON.

(8) Although this article has no special bearing upon eye diseases, we wish to call the attention of our readers to what **Morten**, of London, has to say on the subject of the treatment of rodent ulcer. This disease is so comparatively common within the province of the ophthalmic surgeon that it is of interest to him to know that Morten has been very successful in treating rodent ulcer with carbon dioxide snow. He has had twenty-seven cases treated by this method with only one recurrence. ERNEST THOMSON.

(9) On the lines put forward by Ohm, **Rohmer**, of Nancy, has treated eight cases of retinal detachment by injection of sterilised air into the vitreous. One success and temporary improvements in six others are reported. The *technique* is similar to that of Ohm.—An ordinary glass syringe is armed with a very sharp needle. The latter is heated in a spirit flame, and whilst still glowing, air is drawn in and rendered sterile by passing over the hot end. Rohmer considers it best to introduce the needle into the sclera at a point opposite to the detachment, next to tap the subretinal space with a Graefe knife, then to thrust the needle further in, in order to puncture the detachment, and, finally, to inject the air into the vitreous. A maximum of ½ c.c. of air is injected, and care is taken that a pressure of not greater than 150 to 200 grammes is exerted, for anything higher than this may produce lens changes and retinal hæmorrhages, as has been shown experimentally in rabbits. The air is completely absorbed in forty-eight hours.

In all cases except one the detachment disappeared at once, and the retina remained in place for forty-eight hours, but the detachment reappeared in six cases. In the successful case no detachment could be seen after four months.

The results are not too encouraging, but have brought forward an interesting fact, namely, that injections of air, far from being harmful to the vitreous, have effected in every case an absorption of vitreous opacities.

BERNARD CRIDLAND.

(10) **Olsho**, of Philadelphia, discusses the "neuro-relapses" that may follow the administration of Salvarsan. He appears to conclude, with Ehrlich, that: "optic and acoustic disturbances are natural phenomena of recent syphilis and are recurrences in nerve tissue, and are not manifestations of a toxicity of Salvarsan." SYDNEY STEPHENSON.

(11) According to **Reese**, of New York City, Salvarsan is a powerful symptomatic remedy in syphilitic affections of the eye. Its action is more rapid than that of mercury, but it should not replace mercury except

in selected cases. It should be administered intravenously, and is best given in combination with mercury and potassium iodide. The sole contra-indication to the employment of Salvarsan in ocular syphilis is furnished by simple spinal atrophy of the optic nerve. In arguing this point, the author states that no cases of tabes or general paralysis have been benefited by its use, while "in instances of spinal atrophy of the optic nerve the administration of Salvarsan has apparently hastened the inevitable end." As to the former claim, opinion at the present time is by no means unanimous as to the uselessness of Salvarsan in the two conditions named by Reese. It is known that in some cases Salvarsan has caused definite improvement. Cases are on record where the injection of Salvarsan was followed by loss of the Argyll Robertson phenomenon and of the "shooting pains," together with marked improvement in the subjective symptoms of the malady. In the earlier stages of tabes, at all events, it is quite likely that Salvarsan may bring the process to a standstill. Reese's statement therefore is too sweeping to be accepted without modification. As to the other claim, namely, that Salvarsan makes simple optic atrophy worse rather than better, there is much evidence to the contrary. Because a spinal optic atrophy becomes worse after the injection of Salvarsan, it by no means follows that Salvarsan has a bad effect, although it may go to show that it has no retarding influence upon the course of an essentially progressive disease. SYDNEY STEPHENSON.

BOOK NOTICES.

The Ocular Muscles : A Practical Handbook on the Muscular Anomalies of the Eye. By HOWARD F. HANSELL and WENDELL REBER. Second edition, rewritten and enlarged. Philadelphia: P. Blakiston's Son and Co., 1012, Walnut Street. 1912. Price, 10s.

The friends of Drs. Hansell and Reber on this side of the Atlantic (and they are many) will welcome a second edition of their useful book on the ocular muscles, which represents, in essence, the lectures delivered in the regular course at the Philadelphia Polyclinic. It is written for the beginner in ophthalmology, whose acquaintance with the higher mathematics is probably not his strongest point. We have here a straightforward and eminently sane account of the muscular anomalies of the eye, put together in such a way that it can be followed and understood by any educated practitioner of medicine. Careful perusal has convinced us that the authors have made good their aim, as put forward in the Preface, namely, "to avoid discussions and speculations, to emphasize methods that have stood the test of their own experience, and to omit no important data that have been recognised as trustworthy."

The Ocular Muscles is a short book. It contains 82 illustrations, to say nothing of three plates. Anatomy and Physiology occupy the first 37 pages; Structural Anomalies—*i.e.*, the ocular palsies—are discussed in 33 pages; the Functional Anomalies—*i.e.*, heterophoria and heterotropia—extend to 120 pages; and the final 16 pages are devoted to a discussion of operations upon the extrinsic muscles of the eye. In the brief compass of 221 small pages we have, then, an adequate account of an important and difficult branch of ophthalmology.

As regards the diagnosis of heterophoria, Hansell and Reber recommend the compound Maddox rod and the cover and the parallax tests, although

Stevens' phorometer has many warm advocates. The cover and the parallax tests have one great advantage—to wit, that they find the eyes just as they are and as the patient uses them all day long. The phorometer is rapid in application and helpful as indicating for beginners the kind and degree of deviation present. The tests at reading distance include v. Graefe's "dot and line" and the Maddox reading test. But the authors now rely almost entirely upon the Maddox compound rod and the small electric light commonly employed in the electric ophthalmoscope. The light is held by the patient at his usual reading distance, and the muscle balance at that point is determined just as quickly and accurately as in the test for infinity.

The almost complete correction of any associated error of refraction, as ascertained under complete paralysis of accommodation, is regarded by the authors as the first and most essential step towards relieving both esophoria and exophoria. That failing, prism exercises are advised, together with the administration of nerve sedatives, as tincture of belladonna, in the former, and of nerve tonics, as tincture of nux vomica, in the latter condition. As to correction by prisms (base out or in, as the case may be), Hansell and Reber are not exactly enthusiastic. In any event, the prisms should be much weaker than the prismatic equivalent of the existing defect, and, as a rule, they should be worn constantly. Operation should in all cases be regarded as the last resort.

In the management of hyperphoria matters are somewhat different. The persistent use of glasses to correct any error of refraction is, however, important, and should be tried, although it seldom succeeds as well as it does in exophoria, and particularly in esophoria. Prism correction is indicated in hyperphoria. About one-third of the defect is neutralized, and it is better to divide the effect between the two eyes than to place the entire prism before the hyperphoric eye. When all other means have failed after a fair trial, operation (tenotomy or advancement) may be necessary. SYDNEY STEPHENSON.

Pathology of the Eye. By P. H. ADAMS. London: Henry Frowde, and Hodder and Stoughton. 1912. Price 5s. net.

Adams' *Pathology of the Eye* is a little volume belonging to the series of Oxford Medical Publications. There are twelve chapters, 194 pages, and 160 illustrations. According to the preface, "This book is founded on a series of demonstrations prepared for men attending the course for the Diploma of Ophthalmology at Oxford University. It is hoped that it may be of use to those working for this or similar examinations, and also to others already engaged in eye-work, especially if dependent on their own exertions for the performance of pathological work." After reading the book with very considerable interest, we think the author's hope for a field of usefulness is quite justifiable. That there are gaps in the information given is obvious and inevitable, but the above quoted paragraph from the preface largely disarms criticism on this score.

In spite of the necessary condensation, the text is quite readable, a fact which seems due partly to an easy style of writing and partly to a judicious admixture of the clinical with the pathological in the make-up of the book. The latter characteristic is especially noticeable in the useful chapter, the second last, on general diseases affecting the eye.

The last chapter is concerned with bacteriology. In spite of its brevity and intentional absence of detail as to methods, it is valuable as showing at a glance the principal facts about the organisms found in connection with the eye.

The illustrations are photographic. Many of these are excellent, although justice hardly seems to have been done in the reproduction of some of them.

Anatomical photographs are always difficult of interpretation by one who has not seen the original specimen. Personally, we much prefer drawings for a book of this class, but the question of expense is doubtless the deciding factor.

When a second edition is called for, the author will naturally correct such errors as " likes " for " lakes," " ulcer cornea," " iris Bombé," " Warren " Tay, " sight " for " site," " Mule's operation," etc. Surely also " Leishmann " should be " Leishman," and we know no authority for " capsule of tenon."

Apart from typographical errors, one or two points have occurred to the reviewer.

In the chapter on practical pathology it is recommended that sections be placed in oil of origanum in order to flatten them before using xylol and mounting in balsam. Oil of origanum has a disagreeable and very persistent odour when in any quantity, and, in the reviewer's opinion, the convenience of it can be too dearly bought.

Assuming that the author is limited as to space, we make the suggestion, for what it is worth, that the eleven pages devoted to consideration of the anatomy and physiology of the retina might be pruned, to the advantage of some other parts of the book. Is it not cutting things rather fine to devote only thirteen lines to interstitial keratitis? Would not a little filling out of the paragraph on sympathetic ophthalmia be advantageous?

On page 80 it might be well to explain definitely, and not merely inferentially, that the name " Coppock " is the name of a certain family.

Certain sentences require recasting, notably that on page 89 in which one is led to suppose that the retina disappears altogether at the ora serrata.

In two places, pp 88 and 176, the Roman letter " m " has been wrongly used for the Greek letter " μ " to signify micromillimetres ; a somewhat large mistake since " m " is the recognised symbol for " metre."

Print, paper, and binding of this little volume, which can be confidently recommended to the elementary worker, are alike excellent.

ERNEST THOMSON.

Diseases of the Eye. By M. STEPHEN MAYOU. London : Henry Frowde and Hodder and Stoughton, 20, Warwick Square, E.C. 2nd Edition. 1912. Price 5s.

In the ordinary way, the second edition of Mr. Mayou's elementary manual, which belongs to the series of Oxford Medical Publications, would call for little else than congratulation, because we reviewed the first edition at considerable length in 1908. In essential particulars the book is the same as before, despite a change in the type-setting, resulting in a lighter and thinner volume, and certain alterations and additions in the text. For the very reason, however, that formerly we made some criticisms on the first two chapters, it seems necessary to remark of the second edition that the author has permitted it to be published without a thorough revise. We have the highest opinion of Mr. Mayou's scholarship, and know perfectly well that he does not mean what he says when he allows it to appear that " the image of the fundus in the indirect method is an inverted virtual one," that " the size of the image formed on the retina depends on its distance from the eye," and that " the angle which this (namely, the visual axis) makes with the true optical angle of the eye, is known as the angle 'Gamma' "; yet it seems truly a pity that a book which is in most respects excellent should be somewhat marred for the student to whom it is addressed, and to whom accuracy is essential, by such mis-statements as the foregoing. Ambiguities, such as that on page 5 about a candle and a mirror, and loose constructions in general, might also have received attention when a second edition was being prepared Many of the faults in the first edition have been remedied. Why have others, equally obvious, been allowed to remain? ERNEST THOMSON.

Manual of Ophthalmoscopic Diagnosis of typical Fundus Conditions, with special regard to cases important in General Medicine, for Practitioners and Students. (Ophthalmoskopische Diagnostik an der Hand typischer Augenhintergrundsbilder. Mit besonderer Berücksichtigung der für die Allgemein-Medizin wichtigen Fälle für Arzte und Studierende.) By Privat-Dozent Dr. C. ADAM, Assistant in the Royal University Eye Klinik in Berlin. Berlin and Vienna 1, Maximilianstrasse, 4: Urban and Schwarzenberg. 1912. Price, Mk. 21.

Eighty-six beautiful coloured drawings on forty-eight plates, eighteen sketches in the text, and 232 pages of text itself constitute Adam's ophthalmoscopic text-book. It is not called an Atlas. The author specially avoids that title. Earlier text-books have, he says, gone upon the principle of representing the individualities and symptoms of clinical disease-entities. The first to adopt the ophthalmoscopic symptom as a principle of classification was Elschnig, and the author of the book presently under notice says in the preface, "A glance at the table of contents will show that the ophthalmoscopic symptom has been taken as the sole basis of classification: hæmorrhages, white spots, black spots, etc., etc., and that it has been sought to arrive by means of these symptoms at a diagnosis and clinical comprehension of the disease pictured."

The text begins with eleven pages of description of the *technique* of ophthalmoscopic investigation, and then the normal fundus is discussed. Thereafter, the appearances and the meaning of the different varieties of conus and staphyloma are fully gone into. Then come optic atrophy and neuritis and changes in the retinal vessels. After this, which takes us up to page 109, there is a full account and illustration of the various conditions of the retina and choroid as they are likely to be observed in practice. The ocular manifestations of the most important general diseases, such as syphilis, tubercle, and renal disease are carefully studied. Myopia, as one would expect, receives considerable attention. In addition to four drawings, there is a full explanation in the text of the fundus appearances in that condition.

There are numerous references to glaucoma. The plates in which glaucomatous and extreme physiological cupping are compared are excellent, and on page 54 there is a very comprehensive table showing the points in the differential diagnosis of various forms of optic atrophy.

It would be tedious to go into greater detail about this volume. Suffice it to say that the plates are among the best we remember to have seen, that the explanations attached thereto are most clear, and that in the general text the minutest care is taken to explain everything. Further, lest there might be an excuse for not finding a subject owing to the rather complex arrangement of the text, there are indices in plenty—namely, a contents list of the text, a contents list of the plates, an alphabetical index of the plates, showing at a glance everything that is to be seen and exactly where it is to be seen, and, lastly, a complete index of all the subjects treated of in the text. Thus, no matter what one wants to find, it is intended that one should be able to find it if it is in the book. The volume, in paper cover, measures eleven inches by eight inches by one inch, and weighs, unfortunately for the reader, over three pounds. It is certainly excellent value for a guinea, more particularly to those conversant with German. ERNEST THOMSON.

THE
OPHTHALMOSCOPE.
A MONTHLY REVIEW OF CURRENT OPHTHALMOLOGY.

VOL. X.—No. 11.] *NOVEMBER 1, 1912.* [TWO SHILLINGS.

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ORIGINAL COMMUNICATIONS.

AN OPHTHALMOLOGICAL CONTRIBUTION TO THE DOCTRINE OF SCROFULOSIS.*

BY

PROFESSOR M. STRAUB,

AMSTERDAM, HOLLAND.

ALL of us daily see children who are suffering from the disease, which was formerly called "phlyctenular conjunctivitis" and "keratitis," and which now mostly goes by the name given to it by Horner, "eczema of the eye"

We all agree that these children suffer not only from this eye disease but also from a constitutional disease, predisposing to the eczema. This constitutional disease was formerly called in England "struma" or "scrofula," and later on "scrofulosis."

Our predecessors knew scrofulosis by its signs although they did not possess a satisfactory theory to explain it. The principal symptoms were general unhealthiness, a certain characteristic face, pertinacious and recurrent diseases of the skin and the mucous membranes, swelling of glands, and some undefined relationship to tuberculosis, generally considered as a predisposition to tuberculosis.

In Virchow's excellent discussion of the subject the cardinal point is the sharp distinction between tuberculous and scrofulous matter. So the belief in scrofulosis as an autonomic entity must have been put to a very serious trial when it was found that scrofulous glands had the structure of tuberculous tissue. But not much notice was taken of this discovery. When, however, the tubercle bacillus was found in scrofulous glands by Robert Koch, belief in in the existence of scrofulosis was shaken. Pathologists left off using the word "scrofulosis" and discussing the subject. Medical men hardly dared to breathe the word. It seemed, in short, that scrofulosis and tuberculosis were one and the same thing.

However, the results of the observations of many generations of medical practitioners cannot be cast aside even by the most excellent histological and bacteriological work. Practical observation shows to us now, as before to our predecessors, that scrofulosis is something apart from tuberculosis If it should be a tuberculosis, it certainly is a distinct form, and scientific observation has the task to show the features by which it is to be distinguished from other forms of tuberculosis.

Oculists could, less than other practitioners of medicine, feel inclined to give up scrofulosis, because most of their scrofulous patients are suffering from a non-tuberculous disease—namely, eczema of the eye. However, they have had to acknowledge that tuberculous eye-disease is also observed, although less often, so that it may be given as a rule that scrofulous persons show two kinds of eye disease, the eczematous and the tuberculous, and that in some cases both diseases are observed in one person, either simultaneously or one after the other.

A brief review of the history of our knowledge of ocular tuberculosis will show that tuberculosis as it occurs in the eye has peculiar characters.

Already in 1878 our colleagues, the surgeons, had brought their investigations so far forward that they recognised scrofulous diseases of the joints as tuberculous. In the same year, five years before the discovery of the tubercle bacillus, oculists could have gone as far if they had adopted the views propounded by Haab in a paper published in v. Graefe's *Archiv für Ophthalmologie*, the first communication dealing with ocular tuberculosis in general.

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* Address before the Oxford Ophthalmological Congress, delivered on 18th July, 1912.

The same number of v. Graefe's *Archiv* which contained Haab's communication contained also a paper by Haensell, a pupil of Leber, recording a very accurate experimental and pathological examination and coming to the conclusion that few of the mentioned cases could be considered as tuberculous. At the end of the same number we find, however. a *post-scriptum* by Leber himself, retracting this statement and setting an example of a sharp critical attitude against acknowledging a case as tuberculous without a very full and satisfactory proof, a very sound principle, in this case, however, retarding for years the development of our knowledge. Fortunately, Leber himself continued to give attention to the subject. In 1891 he brought before the Heidelberg Congress a marvellous paper, in which, among others, the rejected cases of Haensell came to the front, now finding grace in Leber's eyes and recognized by him as definitely tuberculous. We learn from Leber's paper that in tuberculous disease of the eye we may expect the well-known histological structure, sometimes a positive inoculation proof, sometimes a positive staining of bacilli, but that the latter two fail in most cases. This has also been the experience of all working in the same line. In eye diseases we cannot rely on staining bacilli or on making a positive inoculation. We must content ourselves with rare positive results. Leber has therefore given his opinion, which I think may be fully adopted, that tuberculosis of the eye is something apart. He proposes the name of "attenuated tuberculosis."

In my opinion, we do not require to coin a new name. The old term "scrofulosis" was exactly adapted to the purpose. The tuberculous eye diseases occur in scrofulous patients. We have a right to speak of "scrofulous tuberculosis," characterised by the astonishing features that inoculation is seldom successful, that bacilli are rarely found, and, we may add, that the course of the eye disease is remarkably benign.

Now the question arises: What is the cause of this special character of scrofulous tuberculosis? My time is too short to develop fully my opinion on the essential nature of this peculiar tuberculosis and of the relation between scrofulosis and tuberculosis. In a few brief words, however, I may outline my argument.

None of us believes that the diseases of the sclerotic, the cornea, the iris, the uveal tract, which we have learned to recognise as tuberculous in later years, are cases of primary tuberculosis. We cannot imagine that bacilli should enter the body, be it by the lungs, the throat, or the intestine, without exciting local changes; that they could pass the glands, without determining local changes; and at length, having found their way into the blood, could settle in the eye, producing there a primary tuberculosis. So we may take for granted that in the body of a patient with ocular tuberculosis, a focus of tuberculosis must be hidden, generally altogether inaccessible to our diagnostic means, which by metastasis has provoked the eye disease we observe. Statistics of *post-mortem* examinations concerning latent tuberculous foci show that in the majority of cases the hidden focus must consist of an aggregation of tuberculous glands, be it at the hilus pulmonum, be it retro-peritoneal, in which tuberculosis is slumbering, attenuated, almost vanquished, by the resisting power of the body.

I take such a latent tuberculosis for the morphological substratum of scrofulosis. It is in itself the result of an infection with bacilli in early youth, overcome successfully for the most part, but having left behind swollen glands, containing still living bacilli, and partly necrotic tuberculous tissue. These glands more or less poison the body by chemical substances, partly produced by the bacilli, partly produced by the degenerated tuberculous tissues The result of this intoxication is disturbance of the general health, and the aptitude for pertinacious and relapsing inflammation of the skin and the mucous membranes.* When tuberculous matter or bacilli enter the blood stream, they produce metastatic benign tuberculous disease, be it in the eye or in other parts of the body, where they find circumstances favourable for settling.

A priori it is possible to ascribe the relatively benign nature of this metastatic scrofulous tuberculosis to attenuation of the bacilli during their long slumber in living tissue, or to a partial immunity of the body in consequence of the previous or co-existing tuberculosis. There is evidence for both views, and it is possible that both concur in giving a benign character to the metastatic tuberculosis. In the period of Pasteur's glorious work on the nature and treatment of infective diseases of cattle, many instances were discovered of microbes attenuated by unfavourable circumstances or by starving. We know at present that also tubercle bacilli lose their virulence by continued culture on artificial media. Bartel tells us that he has found attenuation of tubercle bacilli in lymphoid tissue.

The very important researches of Römer (Marburg) plead for the predominant influence of the other view. Already in 1891 Robert Koch had published his observation that a second infection with tubercle bacilli in a previously infected guinea pig produced only a slight tuberculosis Römer, who has repeated this experiment on a large scale and with many variations, has fully confirmed Koch's statement. In a tuberculous animal a new infection with a small number of bacilli has no influence, and also after an infection with greater quantities, the augmented resistance of the animal shows itself clearly.

These experiments have a valuable bearing upon our theory of ocular tuberculosis. The hidden primary focus has a bad and a good influence. It provokes the metastatic tuberculosis, but it modifies the tuberculosis because it gives to the tissues means of resistance, which certainly make the course of metastatic tuberculosis more benign and probably kill and destroy the greater part of the metastatic culture of bacilli.

I can dwell no longer on the subject of scrofulosis in general, so I will now mention the first of the two special points relating to scrofulosis, which I am desirous of bringing before the Congress.

I acknowledge that, influenced by the then recent discovery of the tubercle bacillus, I began my medical career doubting of the existence of scrofulous disease. Although this disbelief was soon dispelled by observations in practice, still I continued to feel that a decisive proof was wanting showing that our patients with ophthalmia eczematosa had really a constitutional failure. I was fortunate enough to find such a proof. I set out with my pupil Wiemer to determine the specific weight of normal and scrofulous children comparatively. We submerged children in tepid water with the exception of the head, measured the quantity of the displaced water, took the measures of head, and so determined the volume of the children. Then we took the weight on the balance, and by division found the specific weight. In Fig. 1 each of the dots represents the specific weight of a child. You observe at once that among scrofulous children the great majority have a specific weight very near that of water and only little surpassing it. You see at a glance that the majority of normal children have a higher specific weight. By this investigation the impression received by all of us—namely, that scrofulous children are more delicately built than normal children—appears to be correct. The relatively lighter weight of scrofulous children must be ascribed to the lighter weight of the bones. Thus our hidden slumbering tuberculous focus influences the development of bone tissue.

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* See this opinion advocated in my paper: "Ueber Scrofulose und schlummerende Tuberculose," von Graefe's *Archiv f. Ophth.*, Bd. LX, 1905.

My second special point refers to the time of life in which metastatic tuberculous eye diseases develop. In my clinic we have diagnosed, at least since 1909, tuberculous eye disease according to the new principles that are now rapidly spreading. We have gratefully accepted Stock's experiments on metastatic eye tuberculosis (1907) and Wassermann's reaction* (1909) which gave new evidence to those principles, but actually they did not effect much change in our diagnosis, because we had already gained a firm footing in the new direction.

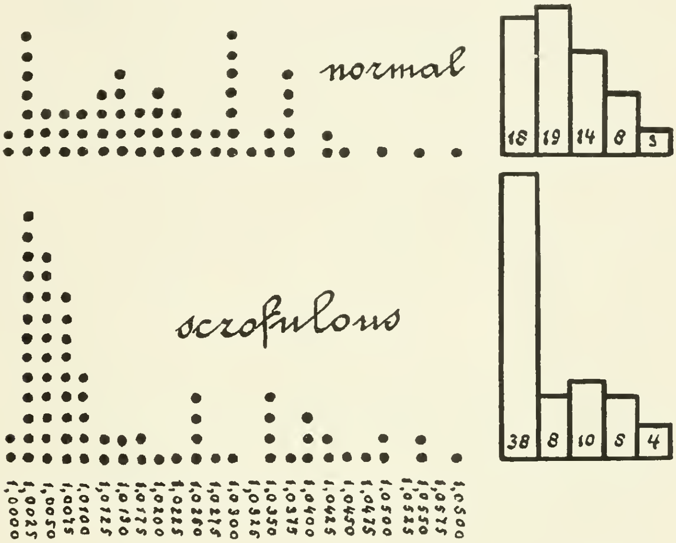

Fig. 1.

Specific weight of Scrofulous Children.

Only in one group of cases we still hesitated, namely, in cases of scleritis, cyclitis, and iritis tuberculosa in old age. For these cases we thankfully accepted the aid of the Wassermann reaction, which put an end to the dogma of the old school, declaring most of the cases under discussion to be syphilitic.

In Fig. 2 you find a record of all our cases of tuberculous eye disease during the last six years, arranged according to the age at which the disease began. You see that there are cases in every age. Men have a maximum at about the age of 20, another at about 35, and you see that there are also many cases in the period of decline of life. Among women there are generally more cases; you find a first maximum from 20 to 30 and a new increase of cases in the period of decline of life. This latter increase is the more important because the total number of living persons at this age is comparatively small. The better to realize the importance of this augment I have calculated relative cyphers, taking in consideration the number of persons living, men and women, in each decade of life in the Netherlands. The result is to be seen in Fig. 3. I acknowledge at once that the number of my cases is too small. I do not feel sure that the three maxima given by the curves are according to the real state of things. Neither do I feel sure that the number of cases among women in old age is really higher than in youth; that may be accidental. I only want to draw your attention to the considerable number of cases in the period of decline, to the frequency of cases in every life-time, and to the fact that in the period of decline the number of cases among women is considerably greater than among men. As we have seen by Fig. 3, this is not owing to the fact that the absolute number of women at this time of life is greater than that of men. I think the cause of the higher morbidity among women is to be found in the lower mortality. In this period the mortality of men by tuberculosis is considerably greater than that of women. Now, it might be objected that this argument tells in the opposite direction. When there are more men dying through tuberculosis one can expect that there will be also more tuberculosis of the eye among the living. This inference, however, is wrong, and brings me back once more to a general consideration of the subject of scrofulosis.

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* See the paper of my pupil Wolff: "Ueber die Aetiologie der chronischen Augenkrankheiten" in v. Graefe's *Archiv f. Ophth.*, Bd. LXXIX, 1911.

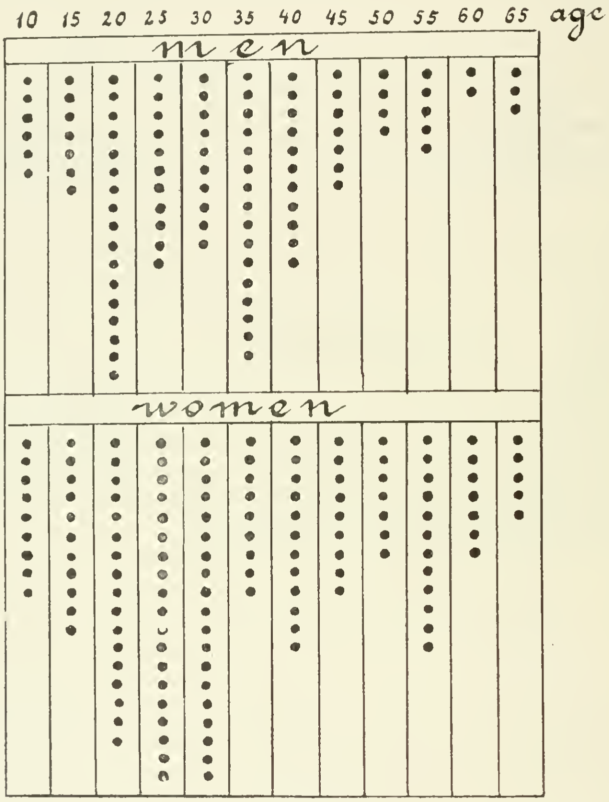

Fig. 2.

Cases of Eye Tuberculosis (absolute number).

Indeed, I have to defend my position in considering these cases. I take it for granted that they are tuberculous, but why are they cases of "scrofulous tuberculosis"? I have several reasons for considering them as such, namely:—

First, the cases have the same character. They are all evidently metastatic, produced by a hidden tuberculosis, very rarely damaging the general health obviously. They are all more or less benign.

Secondly, I have many cases in which the scrofulous disease occurred in youth, signs of which were still evident in the age of decline, so that the most simple conception was that the scrofulosis of youth had revived. In other cases a tuberculosis in adult life may have left behind the hidden focus and the partial immunisation necessary for scrofulous tuberculosis.

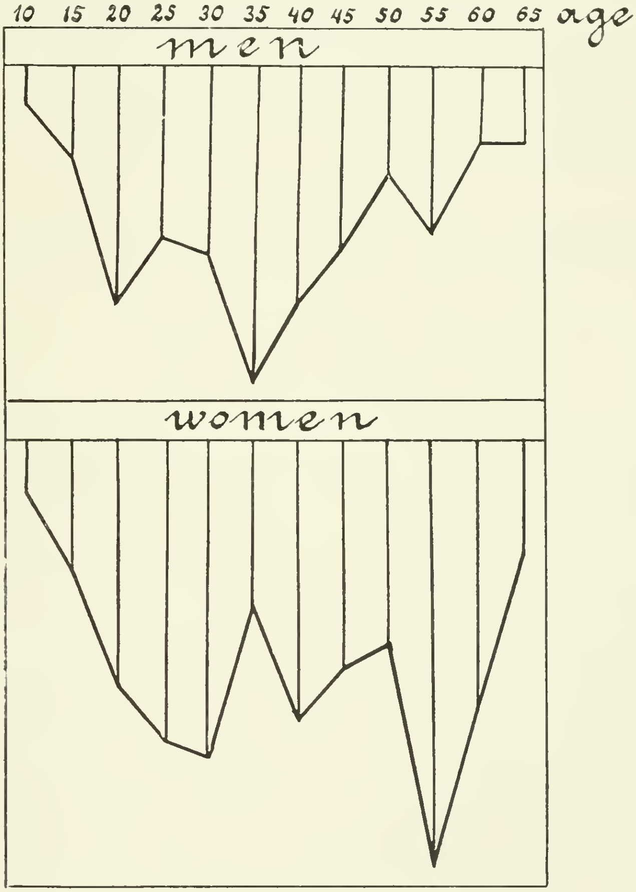

Fig. 3.

Cases of Eye Tuberculosis (relative frequency).

Thirdly, I have examined two cases microscopically, the facts of which I cannot dwell upon now, but in one of which bacilli were found. Both occurred in the decline of life in persons apparently in perfect health with the exception of the local tuberculosis.

Fourthly, I lay stress on the circumstances that eye tuberculosis always occurs in a body containing another focus of tuberculosis, and that there is an inverse relation between the intensity of these two foci. The ocular focus derives its benignity from the partial immunity conferred by the other focus. It is in accordance with our theory that in a body with a severe and mortal tuberculosis, infection of the eye with bacilli will frequently take place, but will rarely be followed by eye tuberculosis, and that therefore the prevalence of grave tuberculosis in a certain condition of life diminishes the number of cases of eye tuberculosis.

Only the slighter foci of small activity permit the development of metastastic eye tuberculosis, still impressing upon it the character of benign tuberculosis in reason of the relative immunity given to it by the primary tuberculosis. The metastatic benign tuberculosis we may call, with Leber, "attenuated tuberculosis," or with our predecessors, "scrofulous tuberculosis"; with either name, it gives us the clue to the understanding of the condition of scrofulosis.

May bacteriology, which showed us the way to understand the disease, soon teach us the remedy too.

ON SALVARSAN AND NEOSALVARSAN IN AFFECTIONS OF THE EYE.*

BY

A. MAITLAND RAMSAY, M.D.,

GLASGOW, SCOTLAND.

WHAT I have to say is based on personal observation of the use of Salvarsan and Neosalvarsan in twenty-two cases of syphilis of the eye. The method of administration was by intravenous injection. The Salvarsan was used in dilute alkaline solution, in the proportion of ·1 gram to 50 c.c. of ·5 per cent. chloride of sodium solution, prepared from water freshly distilled. As a rule, the injection was followed by slight transient rise of temperature, but with the exception of one series of five cases, all treated on the same afternoon, there was no sickness, vomiting, or any other disturbing after-effects. In the five patients just referred to, some of whom had been treated on a previous occasion without any subsequent discomfort, the intravenous injection was followed in two hours by rigor, sharp rise of temperature, and violent vomiting. These somewhat alarming symptoms passed off completely within a few hours, and were attributed to the saline used in the preparation of the solution and not to the Salvarsan. It was thought that, through inadvertence, the saline had been prepared with distilled water which was not perfectly fresh.

"Neosalvarsan" is a substitution product of Salvarsan, and bears the number "914" in Ehrlich's laboratories. It is a condensation product of formaldehyde sulphoxylate of sodium and Salvarsan. It is a yellowish powder readily soluble in distilled water, and consequently has an advantage over Salvarsan in being much more easily prepared for injection. An amount of Neosalvarsan corresponding to ·1 gram of Salvarsan was dissolved in the proportion of ·1 gram to 15 c.c. freshly distilled water. The distilled water should be under 22° C., and the solution must on no account be violently shaken or exposed to heat, and should be prepared immediately before injection. These precautions are taken in view of the fact that Neosalvarsan becomes oxidised even more readily than Salvarsan, and forms compounds which are highly poisonous.

The dose administered averaged from ·3 gram to ·5 gram according to the age, sex, and constitution of the patient. It was, as a rule, repeated in about a fortnight, and in a few cases a third injection was given, but at a much longer interval.

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* A contribution to the discussion on Salvarsan in Diseases of the Eye at the Annual Meeting of the British Medical Association at Liverpool, on July 26th, 1912.

The treatment of the patient preparatory to the injection was similar to that usually carried out before the administration of a general anæsthetic. For two or three days after the injection the patients were kept in bed under strict supervision.

It is important to emphasize here that the intravenous injection was followed by the regular administration of mercury. As a matter of fact, in most of the cases a course of mercurial treatment was only temporarily interrupted to enable the Salvarsan or the Neosalvarsan to be given.

Of the twenty-two patients under consideration, all but two were suffering from a chronic form of syphilis. Of these twenty, five had inherited and the remaining fifteen had acquired the disease. Of the two acute cases one showed primary and the other secondary symptoms. Adding these two cases to the fifteen non-congenital chronic cases gives seventeen cases of acquired and five cases of congenital syphilis. The clinical diagnosis was confirmed in every instance by the Wassermann test.

Of the five congenital cases two suffered from interstitial keratitis, two from choroido-iritis, and one from advanced optic atrophy, the result of a specific intracranial affection. The case of optic atrophy, as was to be expected, was in no way benefited so far as sight was concerned, although the patient's general health was markedly improved. The two patients suffering from keratitis had previously undergone a course of treatment with mercury, and in both the improvement which followed an intravenous injection of Salvarsan was rapid and decided. Neither of the patients suffering from choroido-iritis received any perceptible benefit, but in both the pathological changes in the eyes were such that successful treatment could not reasonably be expected.

Among the seventeen cases of acquired syphilis, the one showing primary symptoms was a man with a well marked chancre of the left upper eyelid. Within eight days after the intravenous injection of ·3 gram of Neosalvarsan (in this case only one injection was given) the sore, which had been spreading rapidly, was completely healed. The case of the patient showing secondary symptoms falls to be considered along with those of the chronic cases suffering from iritis. The other fifteen cases of acquired syphilis showed symptoms of chronic disease. Of these, two were the subjects of oculo-motor paralysis. The duration of the eye symptoms was two years in one of the patients, and seven months in the other. So far as paralysis is concerned, both have made a complete recovery. One patient suffered from syphilitic ulceration of the conjunctiva. The disease had progressed for six months, and during this time the treatment was irregular and intermittent. The result was extensive symblepharon, and rapidly progressive ulceration of both the palpebral and the ocular conjunctiva. The condition at once receded after an injection of ·4 gram Salvarsan, and cicatrisation progressed after a second dose of the same strength. Unfortunately, the further progress of this patient was disappointing. He again neglected medical advice, and for five months stopped all treatment. The ulceration of the conjunctiva broke out afresh, and both corneæ became affected. Two injections of ·3 grm. Neosalvarsan, combined with the regular administration of biniodide of mercury, quickly caused the ulceration to cease, and improvement is steadily progressing, but vision is now seriously and permanently impaired.

One case of scleritis was treated without any apparent improvement. One case of kerato-iritis, which may possibly have been of congenital origin, and which had resisted ordinary mercurial treatment for months, improved considerably after two injections. In this patient, however, the sight had been irreparably damaged by glaucomatous attacks, due to posterior synechiæ and partial occlusion of the pupil.

There were five cases of iritis. In the one, which was acute and already mentioned, both eyes were affected, and the inflammation of the iris was only one symptom of a general disturbance, which had manifested itself also in the skin and in the throat. In this patient the immediate effect of the Salvarsan was simply magical. In two or three days the eyes were free from inflammation, and all the symptoms disappeared completely within three weeks. The vision, which had been reduced to a bare perception of large objects, was restored to normal. In the other four patients the disease was of much longer standing, and although the efficacy of Salvarsan was undoubtedly great, the results following its administration were not so extraordinary as in the recent acute case which has just been described.

There were five cases of choroiditis, and although all of them improved, yet, as was seen in the case of iritis, the more recent the infection and the more acute the inflammation, the more rapid and decided was the action of the Salvarsan.

One case of choroido-retinitis of two years' duration neither felt nor showed any improvement after two injections accompanied by mercurial treatment. A third injection was immediately followed by subconjunctival injections of bicyanide of mercury, 1 in 2000, with the result that the patient noticed an improvement in his sight, although when tested by Snellen's test types, the visual acuity was practically the same as it was before the treatment was begun. The ophthalmoscope, however, showed diminution in the congestion and a partial absorption of the exudation in the fundus.

There was one case of neuro-retinitis in which the appearances in the fundus were suggestive of a gumma of the retina. The patient was a man, forty-eight years of age, who gave a history of syphilitic infection of twenty-five years' standing. He was treated at that time. All his symptoms speedily disappeared. and he thought he was cured. In six years he married. His wife has all along enjoyed good health. They have a family of two, neither of whom, so far as can be learned, shows any signs of inherited disease. No children died, but there was a single miscarriage. The patient himself has been remarkably healthy, and the somewhat sudden loss of sight which occurred in his right eye towards the end of January, 1912, is the only symptom of illness. The right eye, to external appearance, shows no sign of inflammation, and has never caused any pain. The pupil is active and the intra-ocular tension normal. Sight, however, in this eye is 1/60, owing to a defect in the centre of the field of vision, the periphery of which is of normal extent. The fundus is readily seen with the ophthalmoscope. The optic disc is of a pale red colour and somewhat indistinct outline. The retinal veins are large and congested, but not unduly tortuous; the arteries are of normal size, and in parts over the surface of the disc as well as in its immediate neighborhood are partially hidden in exudation. There are no hæmorrhages. The retina for a considerable distance around the disc presents a dirty grayish-green colour, and seems to be distinctly swollen and to project in the neighbourhood of the macula. This peculiar gray colour gradually merges into the normal red of the fundus. Active mercurial treatment was administered for five weeks, but with no effect; ·4 gram Salvarsan was given intravenously and in a fortnight was followed by a second injection of the same strength. When the eye was examined by the ophthalmoscope three months afterwards, the change in its appearance was very striking.

As far as I can judge, there is no difference in the therapeutic effect of

Neosalvarsan and Salvarsan, but it is claimed for the former that it is more active, and that undesirable after-effects are less liable to follow its use The ease and accuracy with which the newer drug is prepared for injection and the neutral reaction of the solution, are, however, two very strong points in its favour.

The rapidity with which Salvarsan acts is undoubtedly its most outstanding characteristic. In an acute case, more especially, it quickly brings the disease under control, and if given in time, it prevents permanent damage to the delicate structures of the eye. There is, however, good reason to doubt whether by itself it is really curative, and my own experience supports the view that the most trustworthy results are obtained when Salvarsan is combined with a course of mercurial treatment.

It happens occasionally that a recrudescence of the disease occurs after an injection of Salvarsan—iritis, choroiditis, neuritis, etc.—but this ought to be regarded as a further manifestation of the syphilis rather than a noxious action of the drug, and should in consequence be met by energetic anti-syphilitic treatment. One of my patients, who was suffering from iritis in both eyes, had received two intravenous injections of Salvarsan. The inflammatory symptoms rapidly subsided. The patient was sent home and told to take regularly a mixture containing biniodide of mercury. For three months he continued the treatment faithfully, but at the end of that time his sight was so good that he thought he was cured, and consequently discontinued the mercurial. Four months later he returned to hospital suffering from an acute inflammation of the left eye, accompanied by increase of the intra-ocular tension. A third injection of Salvarsan was given at once, and was followed by immediate relief. In this case an iridectomy was necessary for the relief of the glaucomatous symptoms, but the effect of the Salvarsan was as prompt and decided as it had been when the patient first came under treatment. Needless to say, the biniodide of mercury was again prescribed, and the man was warned not to discontinue it until he had permission to do so.

Dr. Ivy Mackenzie has recently drawn my attention to the case of a young soldier who was under his care and who developed a recurrence in his eyes after treatment by Salvarsan. He received a subcutaneous injection two months after the appearance of a chancre, and within two months after the injection he developed irido-cyclitis in the right eye. It ought to be added, however, that the subcutaneous injection, which was in the form of a neutral suspension of the drug, had not become absorbed, as there was at the site of injection a fluctuant swelling about the size of a hen's egg. A second injection of ·4 gram Salvarsan was given and within a week the ocular inflammation subsided. Two months later, however, both eyes became inflamed, and as the patient was now resident in the country, and it was inconvenient to bring him to town, mercury was administered by intra-muscular injection. In spite of this treatment, however, sight rapidly deteriorated. When the patient was brought back to Glasgow, an intravenous injection of Salvarsan was given, and the mercurial treatment was continued. The inflammatory symptoms subsided rapidly, but vision remained seriously impaired. I think there can be little doubt that Salvarsan had nothing to do with the onset of the ocular inflammation in this case, and that the patient suffered from typical syphilitic irido-cyclitis. I feel very sure that had the Salvarsan been combined with a thorough course of mercurial treatment from the beginning, such an unfortunate complication would in all probability never have occurred.

As far as my observation goes, Salvarsan acts best in the acute ocular manifestations of syphilis. In chronic cases its good effect is neither so rapid nor so striking. The explanation of this is not far to seek, for where a disease is chronic, a condition of mutual adaptability between the virus and the tissues of the host has been set up, so that the effect of treatment, which probably after all depends on a stimulation of protective properties in the host, is not likely to be so successful.

A good deal has been written on the toxic properties of Salvarsan and its injurious action on the optic and on the acoustic nerves. There is, however, good reason to doubt whether the drug itself has had any poisonous effect on the tissues of the eye. Atrophy of the optic nerve due to atoxyl is a well-defined and characteristic condition, but in the cases that have been recorded there is nothing to suggest that Salvarsan gives rise to any such degeneration. It is far more probable that the disastrous results which have occasionally followed its use have been due to syphilis rather than to Salvarsan, and in some of the cases there can be no doubt that proper precautions were not taken in administering the drug.

I have already stated my opinion that if the best results are to be got from the use of Salvarsan, it must be administered along with mercury. In the cure of syphilis the latter is as necessary now as ever it was. The value of Salvarsan lies in its great power to destroy the spirochætes before they have had time to produce irreparable damage to the delicate structures of the eye. It, therefore, prepares the way for the mercury, and consequently the one drug is the complement of the other. Nor must local treatment be neglected. The judicious applications of leeches, counter-irritants, and subconjunctival injections, as well as the use of pilocarpin hypodermically are valuable adjuvants to the constitutional treatment, and their use at the proper time may make all the difference between success and failure.

ON SALVARSAN*

BY

DR. W. B. MARPLE,
OF NEW YORK CITY.

SOME twenty-five years ago when working with Dr. Herman Knapp, I remember asking him on one occasion why he did not use some remedy about whose wonderful efficacy our special journals at that time contained glowing accounts. His reply, as he laid his hand on my shoulder, was, " When you have tried as many new remedies as I have done, you will not be so eager to try everything you read about. You will learn also that you cannot rightly estimate the value of a new remedy, or procedure, until its ' boom is over.' " In other words, there are always those who rush into print with premature or carelessly followed observations about every new remedy, so that until the dust of these premature observations is removed from the medical atmosphere, in other words, until the " boom " (as Dr. Knapp called it) is over, it is impossible for a thoughtful man to get his bearings. I have lived long enough to realize the truth of what Dr. Knapp said, and in nothing has it been truer than of Salvarsan, especially as used in ophthalmic therapeutics. I was therefore rather pleased, on the Continent, a year ago, when one of our most prominent *confrères* told me he had never used Salvarsan ; he was waiting till the " boom " subsided and he could sift the wheat from the chaff.

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* A contribution to the discussion on Salvarsan in Diseases of the Eye at the Annual Meeting of the British Medical Association, held at Liverpool, July 26th, 1912.

I have used Salvarsan in two conditions, interstitial keratitis, and specific iritis with a gumma or syphilitic papule of the iris.

In several cases of interstitial keratitis which showed a markedly positive Wassermann reaction, I have employed Salvarsan by intra-venous injection. Although the Wassermann reaction was subsequently negative, there was no appreciable effect on the condition of the keratitis except possibly a slight diminution of the photophobia.

I have similarly employed it in two cases of iritis both also showing a markedly positive Wassermann reaction with a so-called gumma of the iris in each. The pain, photophobia, lacrymation, and ocular injection were intense, and I used nothing for several days except atropine, dionin, hot fomentations, and leeches, and the improvement in both cases was surprising. The pupil was dilated except at the site of the papule, the eye whitened, photophobia was abated, and in one case there was no further pain, in the other, the pain at night continued. But in neither case did the treatment have any effect on the papule of the iris, which in one case involved two-thirds of the breadth of the iris in the lower nasal quadrant. After the above treatment had been continued about a week, Salvarsan was injected. The disappearance of the papule of the iris was now extraordinary. The large one referred to above was diminished in size one half in forty-eight hours, and at the end of five or six days had disappeared—a synechia, however, persisted.

Having satisfied myself in these cases as to what the ordinary treatment will do, I shall in a similar case give the Salvarsan at once and thus cause the prompt disappearance of the iris nodule. There will then be less probability of the persistence of the synechia.

From my slight experience with Salvarsan, I would say that in interstitial keratitis it has no effect except possibly that of slightly diminishing the photophobia, and that in specific iritis with nodules it causes the rapid disappearance of the so-called gumma of the iris.

ON SALVARSAN IN DISEASES OF THE EYE, WITH PARTICULAR REFERENCE TO ITS USE IN SYMPATHETIC OPHTHALMITIS.*

BY

S. H. BROWNING,

LONDON, ENGLAND.

LITTLE remains to be said on the subject of the treatment of syphilitic eye conditions by means of Salvarsan, so I should like to add a few words first of all on the treatment of sympathetic ophthalmitis by this drug, and, secondly, on my reasons for suggesting this as a rational form of treatment.

Some two and a half years ago A. W. Ormond suggested to C. Price-Jones that he should make blood counts on patients suffering from sympathetic ophthalmitis, and Ormond recorded the result of three cases at the meeting of the British Medical Association held two years ago. At the same time, I had independently, been doing blood counts on definite cases of sympathetic, and found in every case a typical blood count. The differential count in

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[*] A contribution to the discussion on Salvarsan in Diseases of the Eye at the Annual Meeting of the British Medical Association at Liverpool on July 26th, 1912.

these cases showed a marked increase in the number of large mononuclear leucocytes at the expense chiefly of the polymorphonuclear cells, and in some cases 30-40 per cent. of the white cells were of the large mononuclear variety. Now this is the type of differential count that one finds in the blood of patients suffering from protozoal infections, and one immediately wondered whether sympathetic ophthalmitis might not be a protozoal infection, and from the results of Salvarsan in the treatment of protozoal disease, it seemed only reasonable to try the effect of the drug on the course of sympathetic ophthalmitis. Mr. W. Lang, of Moorfields, at once fell in with the suggestion, and I gave a boy under his care 0·5 gram. intravenously, having first made several blood counts. This boy's count before the injection showed 32 per cent. of large mononuclears, and thirty-six hours after the injection they had fallen to 18 per cent., and three days later to 12 per cent. The eye condition was very greatly relieved, and the boy left Hospital with a comfortable eye. I saw him some months later, and found that the eye was getting bad again. His count was up to 24 per cent. large mononuclear cells. A further injection was given with the same results as before, namely, the blood count became nearly normal, and the eye much better. This boy has had three injections of 0·5 gram. His eye is now much better than when he first came for treatment.

I have treated about seventeen cases of sympathetic disease by means of Salvarsan, and always with a similar result, more or less. The count approaches the normal again, and the eye becomes quiet. I cannot say, however, that any case has been cured so far, except perhaps three cases in which the diagnosis, apart from the blood count, was not certain, but I think the facts that the blood approaches the normal, and that the eye condition is much relieved are suggestive. The cases treated have been of long duration, and I think that if one got them earlier more could be done for them. Most of these cases have shown negative Wassermann reactions, so that the protozoal type of count was not due to syphilis. Of course, Salvarsan has been given *experimentally* in England and abroad, and several cases of the cure of sympathetic disease have been reported in French and German literature.

As regards dosage, as in syphilis, I always give the largest dose that the patient can stand, and invariably by the intravenous route. I have my saline made from freshly distilled water, and sterilised just before use. A tourniquet is placed on the patient's arm, and the anticubital space is painted with iodine. The needle, connected to the funnel, containing saline, by rubber tubing, filled with saline, is plunged into one of the prominent veins of the forearm, the funnel is lowered and the blood allowed to flow back to the glass window just beyond the needle. The tourniquet is then removed and about 30 cc. of saline allowed to flow into the veins to prove that the needle is wholly in the vein. The Salvarsan is then run in and a further lot of saline (about 30 cc.) follows to wash out the tube and the vein. The needle is withdrawn, and some Mead's strapping applied to the puncture. The patient is kept in bed for twenty-four to forty-eight hours. All my patients are prepared as for operation before they receive an injection of Salvarsan,

As regards complications, I have only once had thrombosis of the vein, which made a successful recovery, and when I first started, the patients were sometimes sick, and had rigors and temperatures. Now they seldom have any general disturbance at all. This may be due to the use of fresh-distilled water, also partly to the increased skill in making the solution, and to the fact that the patients are very carefully prepared.

I have not yet come across any case of optic neuritis or atrophy following treatment by Salvarsan, and although this is supposed to occur more frequently when Salvarsan is given intramuscularly, my friend Mr. C. H. Mills, of London, who has given more than 1,000 intramuscular injections, tells me he has had no trouble in this respect.

As regards the treatment of syphilitic eye conditions, my experience at Moorfields has not been very satisfactory, but, of course, syphilitic eye conditions do not lend themselves to the brilliant results obtained in some other syphilitic manifestations. Some cases of interstitial keratitis have been cured rapidly after Salvarsan ; others it does not appear to have influenced much, probably because the treatment was not persisted in. A case of gumma perforating the eyeball in the ciliary region made a splendid and rapid cure after an injection, combined with iodides by the mouth. Other cases do not seem to get well much more rapidly than when treated with the usual anti-syphilitic remedies, although the patients certainly get a negative Wassermann reaction much more rapidly.

ON THE TOXICOLOGIC AND THERAPEUTIC INFLUENCE OF SALVARSAN AND NEOSALVARSAN UPON THE EYE.*

BY

Privatdozent Dr. JOS. IGERSHEIMER.

HALLE, GERMANY.

IN the first place, I should like to thank the Ophthalmic Section of the British Medical Association for the great honour which they have paid me in inviting me to take part in this discussion. This was done, of course, in the expectation that I should relate to you my own experiences with Salvarsan and its importance in the treatment of eye disease For this reason I will not enter into any discussion of the extensive literature about the new remedy.

How it can be maintained that the preparations of arsenic, inorganic as well as organic, act only by the contained arsenic, is a riddle to me. It is certain that their common factor expresses itself in many respects in their working also. I will speak about this later. Quite apart from the therapeutic point of view, the differences in the arsenic compounds, above all in the toxicological reactions, demonstrate themselves in the clearest possible way. If you poison a cat with arsenious acid, you will see, for example, as is well known, that paralysis of the extremities, which attacks the animal, is an atonic paralysis ; now, a cat intoxicated with atoxyl or another derivative of phenylarsin acid will be attacked, without exception, by extreme spasms and spastic paralysis, as I have formerly shown. The difference is very striking.

Especially in our own department is the difference between the two arsenic poisons most commonly used—arsenious acid and atoxyl—very striking. In the case of arsenious acid, the extraordinarily rare retrobulbar neuritis ; in the case of atoxyl, the terribly frequent degeneration of the optic nerve. One of the best qualities of Salvarsan, in comparison with the already spoken of arsenic compounds, is, in fact, the slightness of the toxic effect—its small organotropy. Here it is specially of interest to mention that I never found any influence with Salvarsan on the nervous system, *intra vitam*, or on the eyes, with my experimental animals (rabbits, dogs, cats). The animals died without having shown any symptoms of disease, after having borne quantities much stronger than the therapeutic doses ; or, they were killed with the aim in view that the eyes might be fixed in a living condition.

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* A contribution to the discussion on Salvarsan in Diseases of the Eye at the Annual Meeting of the British Medical Association at Liverpool on July 26th, 1912.

Only in the case of the cats which were poisoned in a more chronic manner, (from one to two months) one symptom characteristic of all arsenic compounds, appeared, namely, a shedding of the hair from different parts of the body. A second common symptom, which is of still more interest to us as ophthalmologists, is the effect on the fibres of the optic nerve. I now demonstrate diagrams of the optic nerve of a cat poisoned by arsenious acid, and you will see how the medullary sheaths of the nerve fibres have become black, caused by the impregnation with the Marchi mixture. Here it is not a case of degeneration of the medullary sheaths (Marchi degeneration), but a specific, doubtless pathologic impregnation of the medullary sheath (Marchi reaction). This Marchi reaction is, however, to be found, but in a very much slighter degree, in the case of atoxyl and Salvarsan also, but in the latter case only when the poisoning is a very chronic one. I believe myself that the splitting of inorganic arsenic in the body is the cause of these two symptoms, *i.e.*, falling-out of the hair and the Marchi reaction.

I assert therefore that while the compounds of arsenic have certainly qualities in common, they have also their peculiar characteristics, dependent on their molecular values. The prominent quality of Salvarsan is its strong parasitotropic effect on the spirochætes of syphilis, and the slight amount of its organotropic effect. The slight affinity of Salvarsan for the nervous system of the eye (which was at first much feared) is so striking that after several years' experience, one may state, with certainty, that there is no such thing as injury to the eyes of a non-syphilitic person by Salvarsan—at least, such has never yet been observed.

The case seems to be a little different in an organism infected with spirochætes. In the case of a young man who has received several injections of Salvarsan, the only relapse which appeared was an iritis ; two days after another injection of Salvarsan, very severe disease of the retinal vessels took place in the second, and until this time unaffected, eye. In my opinion, it is quite possible, that it is here a matter of a reaction of the spirochætes, which have been for some time lodged in the walls of the retinal vessels. The much-spoken-of recurrence in the nervous system points to the fact that here and there we have to do with stimulating qualities of Salvarsan, as such recurrences are also reactions of the syphilitic nervous tissue to the stronger antisyphilitic remedy. It is not very probable that the Salvarsan itself injures the nervous tissue, or creates a *locus minoris resistentiæ*, but that the specially strong influence on the spirochætes brings this effect about. I have myself observed three cases of papilloretinitis, as a form of relapse after two or three injections of Salvarsan. All were on the one side, appearing in the secondary stage of syphilis, associated with enlargement of the blind spot, central scotoma, and hemeralopia ; in two cases the Wasserman reaction was negative, in one case it was a weak positive, all three had at the time of the relapse no other trace of syphilis. I bring this to your notice, because Ehrlich, and also now Gennerich, suggest that this relapse is a monosyphilide, in a certain degree a new primary effect, from which for the second time, an infection of the earlier sterilized body takes place.

Indeed, the syphilitic character of such nerve affections is also proved by the favourable influence of further Salvarsan injections. In fact, in the case of my three patients, the sudden change for the better always succeeded a few days after the injection ; of course the absolute cure only came about gradually. When I compare the four cases of syphilitic inflammation of the papilla, which I observed in the same period, and which were not previously treated, with the three cases of relapse after Salvarsan treatment, the frequency of the recurrence was not so remarkable as the severity of the disease.

In the case of untreated syphilitics the papillitis was often quite without symptoms, and, in consequence, was to be found only when searched for. The type of disease may be just the same, and I observed it in the case of untreated syphilitic persons, much as in the case of persons treated with mercury. It is a fact that they were always women.

As in the case of relapse, so also in recent cases of syphilitic disease of the retina and the optic nerve I have had favourable experience with Salvarsan, in acquired and inherited syphilis. Of course, there were also some obstinate cases. In some cases, however, the results were in the highest degree astonishing, as in the case of a recent post-neuritic degeneration of the optic nerve, in a man who got so much better in a few days that he could see, instead of fingers at three metres 5/15, of course without enlargement of the very limited field of vision. According to my experience, it is indeed the most recent cases of nervous system disease of the eye which offer the best field for Salvarsan therapeutics ; especially as the quickest means of help is the best. When the nervous tissue is destroyed, it cannot, of course, ever again be replaced, and for this reason it is vain to hope for a cure in a case of tabetic optic atrophy. On the other hand, I have never seen a quicker progression of the optic nerve process appear after the injections.

In the case of other inflammatory affections, above all in those of the uveal tract, Salvarsan often acts excellently. On the other hand, it must also be said that it is especially the iritis papulosa which is sometimes very obstinate, which is all the more remarkable when we consider the great abundance of blood in the iris. I have also observed new nodules after the application of Salvarsan without its being necessary to suppose that Salvarsan produced them. It seems to me to be also worthy of notice that the number of cases of iritis in my syphilitics treated with Salvarsan, was very small, and this number seems to diminish in a striking degree when a very intensive abortive cure has been used (Fehr).

Now I come to that therapeutic reproach, *viz.*, interstitial keratitis. The results of my treatment with Salvarsan have indeed improved since I have made repeated injections, and will perhaps become much better, with more frequent injections. The figures are quite instructive, although for the purpose of formulating a rule they are yet too small.

One injection showed an improvement in five per cent. out of thirty-nine cases ; two injections showed an improvement in twenty-five per cent. of twenty-four cases ; and three injections showed an improvement in thirty-six per cent. of eleven cases. I mean, when I use the word " improvement," only a certain favourable influence in the course of the cure, and never a really quick cure.

What caused me to prefer Salvarsan to mercury, or to combine both, is of the favourable influence on the Wassermann reaction, which with mercury alone hardly ever, or at most after some years, becomes negative in the case of patients with interstitial keratitis. At the Heidelberg Congress last year I was in a position to say that the Wassermann reaction in 50 per cent. of the cases treated by Salvarsan became negative. In further examination, now after another year, I must indeed confess that quite a number of these patients showed a positive reaction, in any case the percentage is very much more favourable than formerly with mercury alone. But this is an important thing to note, as we do not want to cure the eye affection only but the whole constitutional disease.

Among paralyses of the ocular muscles, by a peculiar coincidence, cases with affection of the internal muscles came chiefly into my hands. While many were absolutely resistant to Salvarsan, among which were however several tabetic cases, three others characterised themselves by the fact that the paresis of accommodation became very much better or cured: a young man who had ptosis and paresis of accommodation, apparently from cerebro-spinal lues; again in a case with one-sided ophthalmoplegia interna (nervous system otherwise normal); and, thirdly, in the case of a girl with inherited syphilis, and double-sided paralysis of accommodation. Salvarsan acted especially well in the case of a total paralysis of the entire eye muscle system on account of a gumma in the orbit which pressed upon the optic nerve; in this case the preservation of the sight was due only to the speedy effect of the Salvarsan.

In more isolated cases also (chancres, periostitis orbitæ, lupoid syphilis of the cul-de-sac) Salvarsan has rendered me good service.

I will now give a brief report concerning my personal experience with Ehrlich's latest remedy, "Neosalvarsan," which has the great advantage of being easily soluble. First, an account of some toxicological experiments.—Six cats were treated with intramuscular injections of "Neosalvarsan." Two died one day after the injection, the one had received ·12 gr. and the other ·06 gr. for each kilogram of the body-weight; a third cat, which had been given two injections of 0·07 gr. per kilo of its body-weight, gave signs of great illness, became thin and appeared very weak and unwell: it was killed a month afterwards on account of increasing loss of flesh, very bad necroses at the places where the injections had been made, ataxia and right-sided conjunctivitis. In the eyeball was nothing abnormal to be found microscopically, the optic nerve gave a very weak Marchi reaction and there were some isolated degenerated fibres in the chiasma. This dose was, without doubt, very toxic, smaller quantities (0·03—0·06 gr. per kilo) were well supported, even when they were frequently given. One cat also displayed much necrosis. Microscopically, no changes were to be found in the eyes; in the optic nerve at the most was an insignificant Marchi reaction. Details of the experiments are given in the table.

The rapid death of the animals after injections of larger quantities is very striking. In the case of a corresponding quantity of Salvarsan, I have never yet seen such an acute effect.

At Professor Ehrlich's suggestion, I occupied myself also with the local application of Neosalvarsan on the eye. Ehrlich thought that the remedy could be perhaps used in that way in the treatment of interstitial keratitis. Up to now I have made only preliminary experiments on the normal eyes of rabbits. For these purposes simple instillations cannot be taken into consideration. The way which seems to me to offer the best prospects is injection into the cornea. If we should make use of more dilute solutions, the first clouding reaction passes by, after a few days, without leaving any maculæ; in stronger solutions, the cloudiness lasts a much longer time and is much more intense. I have also made subconjunctival injections, and sometimes necrosis of the conjunctiva followed; while, it is interesting to note, I never observed a necrosis of the cornea, even if the remedy was injected in the cornea itself.

Of course, the question is, if Neosalvarsan must not undergo a change in the body to bring about a full effect.

TOXICOLOGICAL EXPERIMENTS WITH NEOSALVARSAN ON CATS.

Cats.	Weight.	Place of injection.	Separate Doses.	How many Injections?	Intravital appearances.	Microscopically.		Remarks.
						Retina.	Optic Nerve.	
1	1150 gr.	Intramuscular	0·15 gram. = 0·12 gr. pro kg. weight of body	1	Cries very much	—	—	Died on the day after the injection
2	2150 gr.	,,	0·15 gr. = 0·07 gr. pro kg.	2	Cries very much. Loss of weight. Ataxic disturbances after a fortnight. Great necrosis. Conjunctivitis on the right side	Normal	Weak Marchi re-action. Several degenerated fibres in the chiasma	Killed after a month. Eyes fixed in living condition
3	2620 gr.	,,	0·15 gr = 0·06 gr. pro kg.	1	Cries very much	Beginning post-mortal changes	—	30 minutes after death eyes enucleated
4	2620 gr.	,,	0·09 gr. = 0·03 gr. pro kg.	5 in three weeks	None	Normal	Weak Marchi reaction	Killed. Eyes fixed in living condition
5	1600 gr.	,,	0·09 gr. = 0·06 gr. pro kg.	4 in a month	Eats sometimes badly. Strong necrosis.	Normal	—	Killed after 1½ months. Eyes fixed in living condition
6	2320 gr.	,,	0·09 gr. = 0·04 gr. pro kg.	3 in five weeks	None	—	—	Is still alive

Although my *clinical observations* are not very numerous, nevertheless it has struck me that in the case of the only two female patients, who also had nervous symptoms apart from their eye disease, the injection caused such a strong reaction as I have never before observed with Salvarsan. The one patient suffered from secondary lues, iritis, and papilloretinitis, very bad headaches, dizziness, etc., before the commencement of the anti-luetic treatment. She bore two Salvarsan injections and the mercury cure very well; half an hour after the third injection, this time of Neosalvarsan (corresponding to 0·3 of Salvarsan), she became quite delirious and had hallucinations; two and a half hours after this she awoke, and was as before.

The other patient suffered from paralysis of accommodation on a basis of inherited syphilis, and had suffered from dizziness for many years, which only occasionally made its appearance; otherwise the mental and nervous systems were all right. Some months before this she had two Salvarsan injections with the best of success; then Neosalvarsan (corresponding to 0·3 gr. Salvarsan), on account of a return of the paralysis and positive Wassermann; also these attacks of dizziness had lately increased, and her general health was worse; about an hour after the injection she had a terribly bad attack of dizziness, which lasted for several days, such as this patient had never had before. Gradually, the attacks passed away, and the accommodation became strikingly better.

In both cases it was an instance of a great increase of already existing syphilitic symptoms.

I should like to point out that I have seen in several cases of interstitial keratitis after the first injection of Neosalvarsan, such a quick and favourable influence make its appearance, as I have never seen when Salvarsan has been used. Of course, there were also obstinate cases.

All things considered, I believe that Salvarsan and Neosalvarsan are very good, if not ideal, remedies for the eye. I would propose to use Neosalvarsan in the case of affections of the anterior parts of the eye, and Salvarsan for affections of the retina and optic nerve, especially when the nervous system is attacked in any way.

CLINICAL MEMORANDUM.

TRIPLE RUPTURE OF THE CHOROID.

BY

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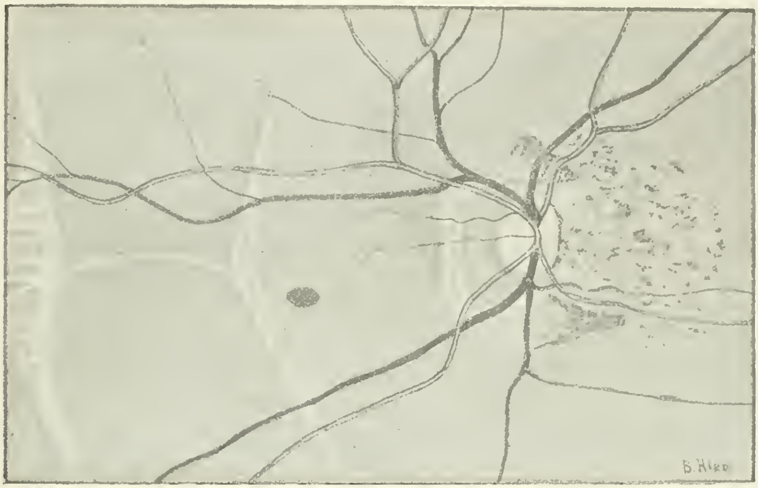
RUPTURE of the choroid is common enough, but my excuse for reporting this case is the fact that it is a triple one of considerable extent accompanied by pigmentary degeneration of the retina, the whole resulting from a blow.

History.—The patient, Jabez E. P., aged 23 years, a railway porter by occupation, received a blow on his right eye from a stone in October, 1905, and presented himself a month later, November 14th, 1905, at the Birmingham and Midland Eye Hospital, complaining that he had no sight in the injured eye.

Ocular condition.—Right vision=fingers at one metre. The right disc was a little pale and there was some œdema in the macular region, the yellow spot region having a cherry-red appearance (see Fig.). There were three ruptures of the choroid, one round the disc with enlarged pigmented extremities, very much like a horse-shoe. The second one was just external to the yellow spot.



Both of these appeared to involve the whole thickness of the choroid. The third rupture was still further out, and seemingly did not involve the external layer of the choroid. The retina was partly detached over the inner portion of this and there was a fine streak extending from this to the middle rupture. There was considerable change in the choroid and retina internally to the disc, consisting of massing of retina pigment and mottling of the choroid.

The right field was contracted and hemianopic, the temporal half being present.

The left eye was normal in all respects. V.=6/6.

NOTES FROM SOME CONTINENTAL EYE CLINIQUES.

(*Seventh Article*)

BY

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VI.—PRAGUE.

THE GERMAN UNIVERSITY EYE KLINIK.

THERE are two University Eye kliniks in Prague, the German and the Bohemian. Owing to want of time, I was unable to visit the latter.

Elschnig's klinik forms a part of the German Allgemeines Krankenhaus. It consists in a series of rooms and corridors on the ground floor—or perhaps more correctly on the basement floor—with separate trachoma wards in an outside pavilion of somewhat makeshift character. There is a large, finely equipped laboratory for experimental and pathological work. The beds are 104 in number, and, in addition, there are those devoted to trachoma.

My time in Prague was all too short, but I wish to take this opportunity of thanking the Professor and his enthusiastic assistants for their kindness in going out of their way to let me see everything that was going on and every patient of interest attending the klinik, in order that my time might be spent to the best advantage.

It is beyond my ability to describe the arrangement of the out-patient department, and of the wards, lecture-hall, operating room and laboratory in this klinik. I was never able to find my way about in it with any certainty, a fact which is partly due to a defective sense of locality, and partly to the somewhat confusing arrangement of the various rooms and corridors.

Out-patient Department.

The only room in the out-patient department to which I will refer particularly is the *Dark Room*, and this not because it is large and convenient, neither of which adjectives seemed to me applicable, but because there are some special points about it.

This ophthalmoscopic room is really a series of small "cubicles" each for one examiner and one patient. The Professor's cubicle (the word is the nearest explanatory one to be found) is larger than the others, and specially fitted.

In each cubicle there are two lamp brackets fitted with electric lamps. The bracket slides smoothly up and down upon, and rotates about, a round vertical rod to which it can be clamped in any position by a thumbscrew. A metal plate is free to rotate in the horizontal plane round the lampholder. This rotating plate has attached to it at right angles and parallel to each other, in vertical planes, two metal discs of such size as entirely to screen the electric bulb. A round opening in the centre of each disc can be screened off with a shutter when desired. These parallel discs present the advantage of a lamp chimney without the chimney's disadvantage, because with the touch of a finger on the edge of one of the discs it is possible (1) to throw the full light of the lamp on the patient while one's own eyes are screened, (2) to use the full light, or that coming from one or other round opening in the discs, for ophthalmoscopy.

The professor has an elaborately fitted special cubicle of larger size than the others. Along one wall of this cubicle and the adjacent portions of the two walls which meet it; *i.e.*, along the wall and in the corners, are fitted (1) seats for patient and surgeon with lamp bracket on each side, and switches for a special purpose to be described; (2) two Sachs' transilluminators; (3) the Hertzell ophthalmodiaphanoscope with its water tanks and special resistance; (4) a cabinet for eye drops; (5) a shelf for spectacles, lenses, ophthalmoscopes, and so on; and (6) a lock-up cabinet for the various intruments belonging to the Professor. On the floor at the observer's left-hand is a basin of lotion, while behind him, near the opposite wall, stands the Zeiss corneal microscope. The Pfister and Streit ophthalmometer is close at hand, although not actually in the cubicle. There is an ingenious cross-switching arrangement between the ophthalmoscopic lamps and a pair of screened lamps showing small points of light on the opposite wall. These latter are fixation objects, and the wiring is so arranged that by turning a switch on the wall within easy reach of the ophthalmolscopist, either fixation lamp may be in circuit with either ophthalmoscopic lamp in such a way that the optic disc or the macula of the eye under observation may be brought into view as one may wish.

Aseptic Surgical Technique.

The subject upon which I desire to lay greatest stress in this article is aseptic surgical *technique* as practised by Elschnig.

Examination of the Conjunctiva.—In cataract cases a bacteriological examination is always instituted on the day before the contemplated operation. If a smear, made from the Elschnig culture inoculated twenty-four hours previously, shows pneumococci or streptococci, the operation is postponed and the conjunctiva is treated with hourly applications of 1 in 5000 oxycyanide of mercury solution, until the pneumo- or streptococci have disappeared. If staphylococci are present in the smear made from the culture, it is necessary to know the variety. An agar culture is therefore made. In the presence of staphylococcus albus the operation may be proceeded with, but if aureus or citreus be found it is postponed. In practice the two culture methods are carried on simultaneously. In the event of postponement of the operation on account of the above-mentioned organisms, the lacrymal passages are also washed out with the oxycyanide solution once daily. After four or five days of such oxycyanide treatment, another Elschnig culture is prepared and examined. On this day, of course, no cyanide is used. If, after all, the organisms have not disappeared in about a fortnight, the operation is usually performed in spite of their presence.

So much faith is placed in the Elschnig method of culture* that if the result of the examination of a smear from it is negative and the case should nevertheless go wrong, the blame is laid upon faulty *technique* rather than upon the undiscovered presence of organisms in the conjunctiva.

The *Operating Room* is a large one. Rough pacing gave the measurement as 33 feet by 24 feet. It is lit by two main vertical windows and two smaller vertical windows. There is no top light. In spite of the fact that the floor of the room is somewhat below ground level, the size of the windows is such that the illumination is ample. Black screens are not fitted to the windows, an omission which seems to be almost the only fault in the room, even in the critical view of the Professor. The floor is of mosaic, curved at the wall, and inclined slightly towards one corner where there is a drain. This floor is washed out with a hose pipe.

The *Sterilizer* is a large one, although not of the colossal size of that described in the article upon Dimmer's klinik in Vienna. It is completely enclosed in glass, so that no steam can enter the operating room, but must pass away by the flue.

Along the walls are large glass cabinets, which contain a great variety of instruments.

The *preparation of instruments and swabs.*—*All* instruments are boiled for three minutes in 1 per cent. soda solution. In Prague, since the ordinary tap water contains mud and organic matter, while the drinking water is sold in bottles, it is found best to use distilled water; but any ordinary drinking water supply is allowed by Elschnig to be all right for use in the sterilizer. Delicate knives, Elschnig says, are not at all damaged by boiling, an opinion also strongly held by Fuchs. (See the statement by the latter on page 483 of THE OPHTHALMOSCOPE for August, 1912.)

The instrument tables are on extra large castors, and can be pushed along with a touch. The instruments are laid out dry, and during operation a dry *technique* is adhered to as much as possible.

Damp squares of gauze are employed as swabs. These are prepared by boiling them with 1 to 5,000 oxycyanide of mercury in a copper dish. From this same copper dish in which they have been prepared, they are handed in tongs to the operator.

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* The Elschnig culture method has been described already in the article on the Freiburg klinik which appeared in the January number of THE OPHTHALMOSCOPE, and need not here be recapitulated.

If fluid must be used in the course of an operation, oxycyanide of mercury solution is the one habitually employed.

In lid operations, and plastic operations, generally only *dry* swabs are used.

Preparation of the Patient.—I noticed that although the skin of the lids and neighbourhood, after being washed with ordinary soap, was treated with benzine, no conjunctival flushing was carried out. Professor Elschnig explained, when asked particularly about this, that when he is satisfied of the non-existence of pathogenic micro-organisms in the conjunctiva, he is content with a minimum of disturbance of the conjunctiva with fluids. If, nevertheless, he must operate under some degree or suspicion of sepsis, more fluid is used in the preparation of the patient, and that fluid is oxycyanide of mercury.

Preparation of the Surgeon.—The preparation of the surgeon is distinctly elaborate. I shall endeavour to omit no detail. Indeed, the various steps have been checked by the Professor himself in reading over the proof. The preparation of the hands and arms is done in the operating room itself, but, previous to entering the operating room, the operator has donned a pair of white linen trousers, a pair of rubber boots which reach almost to the knee, and an impervious apron made of Billroth-battist, which latter is a sterilizable waterproof tissue Proceeding to the wash-basin he prepares his hands and arms in accordance with definite printed instructions which hang in a frame above the basins. First, the hands and forearms are washed for three minutes either with alcoholic potash soap or with ordinary washing soap, in hot running water. The hands are then rubbed for half a minute with a sterile Loofah soaked in 1 to 1000 oxycyanide of mercury solution, and are dried with sterile compresses. Lastly, the hands are laved for half a minute in absolute alcohol. The alcohol is contained in a glass jar hanging on the wall: the cock of this jar is opened by the foot of the operator, and sufficient alcohol obtained to saturate the hands.

The surgeon is then assisted into his sterile operating overall and headmask. The mask here is in the form of a gauze towel with an oblong hole for the eyes and the upper part of the nose. Over the mouth and nose the gauze is several ply thick; elsewhere it is single. When the towel-mask is in position and tied behind the head, the eyes and the upper part of the nose are the only exposed parts of the operator's head and neck region; these are, indeed, the only parts of his person left uncovered with sterile materials.

The assistants are similarly clad, although the special boots and trousers are not always worn.

The instrument assistant—for in this klinik an assistant surgeon, not a nurse, is responsible for the instruments—always wears rubber gloves. He is not allowed under any circumstances to handle sterilized instruments with the bare hand. Any breach of this rule is visited with the severest censure from the chief.

In all plastic operations, and in operations involving the deep parts of the orbit, the operator and all the assistants wear gloves. Elschnig says that he has often performed bulbar operations gloved, and that with a little practice one can operate quite well with them; nevertheless, he considers them unnecessary as a rule. In operations which tend towards severe handling of the eyeball, such, for example, as excision of a staphyloma, where stitches are required, the operator wears gloves. Anyone concerned in any operation who has even the most trifling wound of a finger or finger nail must wear gloves.

The position of the Operator, etc.—Elschnig sits in front of his patient, as do so many other Continental operators, but he does not seem to have a preference for one side or the other, choosing which ever side seems most convenient. There are two operating tables, so that time is saved if the operation list be a long one. The patient's feet are towards the window, *i.e.*, the table is not parallel to the source of light as in most of the kliniks visited.

Individual Operations.

Cataract.—By a piece of very bad luck, I arrived in Prague during an operative lull after a number of cataract operations had just been completed. During my week in that city I saw only one extraction—and that was an extraction in the capsule—although I had at least the advantage of seeing the immediate after-results of quite a number of cases operated on by the method of choice in this klinik, namely, ordinary extraction with incision of the iris at its root. These results seemed to me excellent. A casual inspection in a typical case operated upon by Elschnig barely reveals the small opening in the iris. The opening is so small and so peripheral that it is hidden from view until one looks obliquely upwards through the cornea. The method is described in *Archives of Ophthalmology*, No. 4, 1912, and *Annals of Ophthalmology*, July, 1912.

Elschnig's preference, then, is for this basal incision of the iris with de Wecker's *pince ciseaux*. Should it be necessary to make an ordinary iridectomy, it is his usual custom to attempt intracapsular extraction up to a certain limit of pressure. If with this amount of pressure the lens refuses to budge, he opens the capsule and extracts in the usual way. The single case of intracapsular extraction which I saw, the first intentional one I have ever seen, looked as nice and easy as any operation could look. My suggestion to the Professor that if they would all go so smoothly this would surely be the method of choice, was met by the admission that unfortunately all intracapsular extractions do not go smoothly, and that the operation is extremely risky.

If both eyes are involved, both are operated at the same time; always if the second eye has V.A. less than 1/10, and sometimes even up to 2/10. Quite immature cataracts are operated on if the V.A. in both is so bad that the patient cannot work.

Cataract patients are brought into the operating room in their own beds, and are operated upon therein. The cataract wards adjoin the operating room.

After the ordinary operation, eserine is employed for the first twenty-four hours, and after that, atropine.

All cataract patients sit up in a chair the day following operation. The unoperated eye is bandaged only for the first twenty-four hours. The patient is kept pretty much in the dark for a week. The patient is not kept in the same ward all the time, but is moved on from the darker and quieter to the lighter wards as the days pass.

Glaucoma.—In acute glaucoma Elschnig prefers, as do most operators, the ordinary wide iridectomy. He does not believe in the Lagrange operation for congestive cases. In simple chronic glaucoma his preference seems to be for cyclodialysis, although sometimes the Lagrange is chosen. He prefers cyclodialysis to the de Vincentiis operation in which the pectinate ligament is divided from within the anterior chamber. Cyclodialysis is also a useful operation after other methods have failed to relieve tension.

High Myopia.—In operating for high myopia the lens is first needled, and a few days afterwards removed by a small flap extraction.

Advancement Operation.—The Professor was anxious that I should see his advancement operation. I shall endeavour to make the method clear.—

The conjunctiva is incised and dissected up, the muscle is exposed and held in forceps and the tendon is separated close to its attachment, all in the usual way. Then :

(1) A double-needled thread is taken up. One needle of this is passed into the under surface of the muscle, near one border, through the muscle alone, across towards its other border, down through the muscle and out on its under surface. The muscle is thus held in a loop of the thread and in front of the loop is such an amount of the muscle and tendon as will allow the surgeon to abscise a pre-determined length.

(2) *a.* A second double-needled thread is taken up. One needle is burrowed into the episcleral tissue above, forwards towards the expansion of the superior rectus tendon.

b. A third double-needled thread is passed in the same manner below, towards the inferior rectus tendon.

(3) The required portion of the muscle in front of the loop (1) is abscised.

(4) Over the original insertion of the tendon a vertical trench is made in the episcleral and tendinous tissue.

(5) The second needles of *2a* and *2b* are passed through the muscle from its lower to its upper surface between the upper and lower punctures of the loop thread (1) and the margins of the muscle.

(6) The two needles of the loop thread (1) are now passed through the anterior edge of the vertical trench (4).

(7) We now have the muscle connected by sutures to the episcleral tissue (*a*) at the side of the cornea, (*b*) above and below the cornea ; or, to put it in another way, if the muscle concerned be the external rectus it is shortened and sutured to the expansions of the external (*i.e.*, its own), of the superior and of the inferior recti tendons.

(8) The three sutures are knotted.

(9) The conjunctiva is separately sutured.

This method has just been published in *Klin. Monatsb. f. Augenheilk.*, 1912, but I have not seen the journal, and the description given is my own, made from actual observation.

Enucleation.—Elschnig's preference is for the transplantation of fat from the gluteal region into Tenon's capsule. (For a description see the article on the Freiburg klinik in the January, 1912, number of THE OPHTHALMOSCOPE.)

Enucleation and evisceration (also with fat implantation) are done almost always under Elschnig's "ganglion anæsthesia." The method has been published by Löwenstein in *Klin. Monatsbl. f. Augenheilk.*, 1908.

Ulcus Serpens.—In cases of serpent ulcer of the cornea, Elschnig does not perform a Guthrie-Saemisch section, since engagement of the iris is the constant result. In a particular case which I happened to see, the anterior chamber was opened below, and then, with Elschnig's anterior chamber forceps, a mass of exudate attached to the posterior surface of the cornea was pulled out. This forceps is of the spring type, after the fashion of de Wecker scissors. The blades, which are serrated like a dissecting forceps, open in the plane of the handle, sharkmouth fashion, *i.e*, in the reverse direction to those of an ordinary iris or capsule forceps. The blades are introduced closed. When opened in the anterior chamber one blade is behind the cornea, the other is in front of the iris, which runs no risk of being grasped between them. The exudate, on the other hand, is readily grasped and withdrawn. The edge of the ulcer in this particular case was then thoroughly destroyed with a *very hot* electro-cautery passed twice rather rapidly over it.

Ptosis.—I had the good fortune to observe the Professor performing, for the first time, his modification of the Hess operation, the details of which he has since published in *Klinische Monatsblätter f. Augen.*, for May, 1912. The modification consists in the introduction, between the occipito-frontalis fascia and the lid margin, of a portion of fascia lata from the thigh of the patient himself. The whole of this double operation—on the thigh and on the lid—was performed under local anæsthesia and is worth remembering as showing how much can be done under local anæsthetics if one so chooses. It is probable that British surgeons will continue to prefer general anæsthesia for such operations as this.

The anæsthetic employed is 1 per cent. to 2 per cent. novocain, with one-tenth the amount of adrenalin added to it.

Dacryocystitis.—Elschnig does not favour indiscriminate removal of the sac. If ordinary treatment by probes and syringing fails, then the sac is excised, or else Toti's dacryocystorhinostomy is performed. In either case local anæsthesia is usually preferred. Before passing probes, the sac is irrigated with cocain. For washing out, the favourite antiseptic is 1 to 5,000 oxycyanide of mercury.

Detachment of the retina.—I saw a case of detachment which had been treated by the heroic method of Müller, which demands the Krönlein operation as a preliminary. I understood from the Professor that in his hands this operation generally results in only a slight improvement.

TRANSLATION.

9.—GUIDE TO THE MICROSCOPIC EXAMINATION OF THE EYE.

(*Continued.*)

BY
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WITH THE CO-OPERATION OF
PROFESSOR STOCK (FREIBURG) AND PROFESSOR WINTERSTEINER (VIENNA)
TRANSLATED FROM THE THIRD GERMAN EDITION,
BY
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Injection of Tissues.

1. BLOOD VESSELS.

Injections of colouring-matter are employed to demonstrate the distribution of blood vessels and lymphatics. The author has had little practice in these processes, the application of which to the eyeball is peculiarly difficult. Only a few ophthalmologists are skilled in this department of histology, and the literature of the subject is scanty.

The material used for injection is generally a solution of gelatine in which is suspended the colouring matter. This may be either red or blue. The solution is injected into a blood vessel by means of a good syringe, under uniform, and not too high, pressure lest the vascular walls should be ruptured. Cannulæ of different sizes are required. The cannula is tied into the trunk of a blood vessel, and the nozzle of the syringe is set into the distal end of the cannula itself, or a short piece of rubber tubing is inserted between them. Care should be taken that no air is injected.

The animal is allowed to bleed to death, and the injection is then performed without delay. If the animal is small it is injected as a whole by introducing the cannula into the left side of the heart or into the aorta. In the case of larger animals, if it is desired to inject only one of the afferent arteries, some of the other vessels require to be ligatured ; or pressure forceps are applied wherever the injection mass appears in a wound or issues from a ruptured vessel. The injection process is continued till the organ becomes coloured, or till the mass has been escaping from a vein for some time.

The masses employed may be *cold*, the colouring-matter being suspended in water or glycerine. It is, however, better to use *warm* masses. These latter contain gelatine which solidifies on cooling. In this case not only the mass but also the body of the animal must be maintained at a temperature of about 40° C. The injection is therefore carried out in a warm bath.

Only a few of the numerous injection masses can be noticed here. Many of them can be purchased ready for use from the firm of Grübler in Leipzig, and elsewhere.

A. *Red Masses.*

I. *Warm Gelatine-carmine.*—This is, according to Böhm and Davidoff (*Lehrbuch der Histologie*), prepared in the following manner: 1. A paste is made by rubbing up 4 grammes of carmine with 8 c.cm. of water. To the paste a solution of ammonia is added till the whole becomes dark cherry-red and transparent. 2. 50 grammes of fine gelatine are placed in distilled water for twelve hours, and allowed to swell. The gelatine is then compressed with the hands, and melted in a porcelain vessel at a temperature of about 70° C. The melted gelatine is carefully added in small quantities to the carmine paste, the whole being stirred till a complete mixture of the two fluids is obtained. The mass is allowed to cool to 20° C, and there is added, drop by drop, a 25 per cent. solution of acetic acid till the cherry-red colour begins to change to a brick red opaque tint, the stirring being continued. Next the mass is filtered through flannel, while still warm.

II. *Cold Carmine Mass* (*Kollmann*).—Carmine, 1 gramme, is dissolved in a little water containing 15 drops of concentrated ammonia solution, and diluted with 20 c.cm. of glycerine. To this there is added a mixture of 30 c.cm. of glycerine and 1 gramme of ordinary salt. The whole is diluted with an equal quantity of water.

B. *Blue Masses.*

I. *Berlin Blue Mass* (*Thiersch*).—Four solutions are prepared :—

1. A cold saturated solution of sulphate of iron.
2. A cold saturated solution of red prussiate of potash.
3. A cold saturated solution of oxalic acid.
4. A solution of gelatine in the proportion of 2 to 1.

In a porcelain vessel 15 grammes of No. 4 are mixed with 6 c.cm. of No. 1. In a second vessel 30 grammes of No. 4 are mixed with 15 c.cm. of No. 2, and to the mixture are added 12 c.cm. of No. 3. The contents of both vessels are brought to 30° C, and the liquid in the first is added to that in the second, drop by drop, stirring being continued all the time. Then the whole of the deep-blue mass is heated to 75°-100° C., and filtered through flannel on a hot water filter. (v. Kahlden, *Technik der histol. Untersuchung.*)

II. *Cold Blue Mass.*—1 gramme of Berlin blue is dissolved in 20 c.cm. of water.

After warm injections the body of the animal is placed in cold water to hasten the solidification of the mass. The organs are then excised, and immersed in 80 per cent. alcohol. When cold injections are used, the organs are transferred directly to spirit, and cut into suitable pieces after a few hours.

The sections must be preserved from contact with acids and alkalies.

2. INJECTIONS BY PUNCTURE.

In this process the lymphatic spaces and vessels are filled with colouring matter. The method is applicable to the eye, and demonstrates well the lymph spaces of the cornea. A small pointed syringe is pushed into the tissue to be injected, and it is left to chance to determine what spaces are opened. The injection is performed under a low and constant pressure. Cold aqueous solutions are most suitable for the purpose.

The *lymphatic spaces in the cornea* are well exhibited when Berlin blue is injected by means of a hypodermic syringe into the posterior layers of the cornea. Berlin blue possesses the advantage of not staining the corneal tissue. Tangential sections are made from the back of the cornea.

Decalcification.

It is often necessary to decalcify the tissues of the eye before sections can be made with the microtome. It is rare to find a shrunken and atrophic bulb in which there is not a deposit of calcareous material. This is most commonly situated in the choroid, and not only calcareous plates but even true bony formations may be present. Similar deposits are found in the cornea, in the capsule of the lens, in intraocular tumours, etc. When a bulb containing these is incised, the passage of the knife causes a grating sound, and the calcareous parts can be recognised if pricked with a needle. Such tissues require to be decalcified.

The eye must be well hardened before being placed in the decalcifying fluid, in order to prevent alteration of the soft parts. The hardening is best performed in Müller's fluid, which itself has a slight decalcifying action. Indeed, when the deposit is not extensive, immersion in Müller's fluid for a month is sufficient to remove the lime salts. The action of this medium may be hastened and increased by the addition of a small quantity of nitric acid, and by changing the mixture every eight days.

The following solution, recommended by *Haug*, is, in the author's opinion, the most suitable for the tissues of the eye :—

Nitric acid	15
Absolute alcohol	300
Distilled water	150
Chloride of sodium	1

A large quantity of the fluid is employed, and it should be renewed several times.

Greeff has employed a 5 per cent. solution of trichlor-acetic acid for decalcification with very satisfactory results. If a large quantity of fluid is used, and this is changed several times, even large bony plates are decalcified in a few days. Thorough washing is necessary, as any acid left in the tissue spoils the stains.

The time required for the complete removal of the calcareous matter varies with the extent of the deposit and with the size of the pieces. When the bulb is incised, the seat of the deposit is noted, and the spot examined from time to time by pricking it with a needle or by making an incision over it. When decalcification is complete and the grating sound is no longer elicited, the tissue is at once removed from the fluid. Several days are required as a rule.

The pieces are now washed for 1-2 days, and then hardened in alcohol gradually increased in strength.

If the condition is not detected till the tissue is imbedded, the celloidin must be redissolved in equal parts of absolute alcohol and ether, and decalcification then proceeded with.

If, however, the calcareous foci, or the bony plates are small, it is sufficient to place the imbedded tissue for a time in 70 per cent. alcohol containing 1 per cent. hydrochloric acid, and then to dehydrate and proceed with the cutting.

Bleaching.

For the minute examination of the posterior layers of the iris, the pigment epithelium of the retina, the ciliary body, etc., it is often necessary to remove the pigment, so as to render the tissues transparent and admit of their being stained. This process is carried out when the Dilatator Pupillæ is being investigated.

Mr. John Griffith, of the Royal Westminster Ophthalmic Hospital, adopts the following method: -

1. The eye having been hardened in Müller's fluid in the usual manner is bisected, and portions of the ciliary region or other parts requiring investigation are left soaking in a stream of running water for 24 hours.
2. The tissue is next placed in the bleaching solution - euchlorine—for 48 hours, *i.e.*, till bleached.
3. It is then washed in running water for another 24 hours.
4. It is further hardened in alcohol of gradually increasing concentration.

The bleaching solution is made as follows: One gramme of chlorate of potash is placed in a glass-stoppered bottle, and shaken up with 2 c.cm. of strong hydrochloric acid. Distilled water is now added so as to make 300 c.cm., and the mixture is shaken from time to time. It should be kept in the dark, since exposure to light causes chlorine gas to be evolved, and renders the solution inert. (See " A Contribution to the Anatomy and Physiology of the Iris," *Transactions of the Eighth Intern. Ophth. Congress*, Edinburgh, 1894.)

When, however, tissues are decolourised in bulk, shrinking and displacement of the parts are apt to take place.

A preferable method is, therefore, that of *Leopold Müller*, by which the sections are bleached individually. (" Ueber Entfärbung des Pigmentes in mikroskopischen Schnitten und eine neue Untersuchungsmethode des accommod. und nicht accommod. Auges," *Wiener klin. Wochenschr.*, Bd. viii, S. 59, 1895.) The celloidin sections are placed in 10 per cent. alcohol, next in pure water, and are then exposed in peroxide of hydrogen to sunlight for 48 hours, till they are sufficiently bleached. Unfortunately this renders them very brittle, although they stain well.

Chloride of lime or chlorine water may be employed instead of peroxide of hydrogen, but they possess the same disadvantage.

E. Fick (*Centralblatt für Physiologie*, Bd. IX, No. 19, 1895) recommends a saturated solution of bichromate of potash with the addition of one-third of its volume of dilute sulphuric acid. In a cold solution the bleaching is accomplished in about three-quarters of an hour; if carried out at a higher temperature in the course of a few minutes.

Grunert (*Archiv für Augenheilkunde*, Bd. XXXVI, S. 333) recommends the process of A. Alfieri. The individual sections are bleached. They are transferred from water to a solution of permanganate of potash (1 in 2000), in which they remain for at least 24 hours. If they are exposed to sunlight less time is required. As soon as they have acquired a brown colour they are placed in a solution of oxalic acid (1 in 300), in which they become fully bleached within a few seconds. This method appears to be the most satisfactory.

The duration of the immersion in the two solutions depends upon the quantity of pigment present in the tissue. After the sections have been thoroughly washed in water, they can be stained as desired. They are, however, very fragile, and must be carefully moved with the section-lifter and not with a needle. Such sections are more difficult to stain, and should remain longer than usual in the solutions. The most suitable stain is Heidenhain's Iron-hæmatoxylin. With this Grunert has obtained excellent results.

Preservation of the Bulbs and Macroscopic Preparations.

When the eyeball is kept too long in Müller's fluid, the tissues are rendered less susceptible to stains, the lens becoming hard, etc. The same remarks apply to most of the fixing media, and especially to formalin. After being fixed, the bulbs should, therefore, be preserved in strong (90 per cent.) alcohol, which is renewed from time to time, until it no longer becomes turbid. In this they are left unopened, or they may be divided previously.

There are several excellent methods of preserving the eyeball for macroscopic demonstration or for the museum.

1. GELATINE METHOD OF PRIESTLEY SMITH.

This is an admirable method. The eye is well hardened, and, having been frozen, is bisected. One half may be reserved for microscopic examination. The other half is treated as follows: it is placed, if necessary, in a 2 per cent. solution of chloral hydrate, in order to remove the colour imparted by Müller's fluid, the solution being changed every 2 or 3 days until it is no longer tinged.

It is then placed successively in glycerine solutions, 10 per cent., 25 per cent., and 50 per cent., remaining in each 24 hours or longer. These steps are necessary in order to prevent shrinking of the tissues when the specimen is imbedded in the jelly.

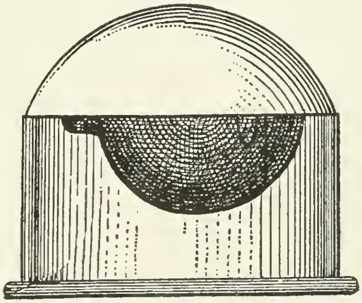

FIG. 4.—Priestley Smith's Jar as modified by Treacher Collins.

The half of the eyeball is placed in a specimen jar, which is partly filled with melted jelly, the concavity of the eye being upwards. When every interstice is filled, the eye is turned over, care being taken to exclude air bubbles. The presence of these can be ascertained by holding the jar over a mirror. If the specimen tends to float in the jelly, it may be maintained in position by means of a pin passed through a strip of card laid across the mouth of the jar.

When the jelly has become hard, the jar is filled, and after a time inverted over a sheet of opal glass. Openshaw leaves just sufficient jelly to cover the specimen, and "when the jelly has become sufficiently firm to support it, a disc of white enamel glass (cut to fit loosely the interior of the jar) is dropped flat upon the surface of the jelly. The jar is then filled with jelly. When the jelly is quite set, a cover of common glass is applied by means of 'black cement,' a mixture of gutta percha, 4 parts, and pitch, 1 part."

The jelly consists of :—

Best French gelatine (Coignet & Co., Paris)	1
Glycerine...	8
Water	8

The gelatine is allowed to swell up in the water, and is then melted by gently heating. The white of one egg is added, and the whole boiled thoroughly and filtered warm through flannel. Lastly the glycerine is added, and a trace of carbolic acid or thymol. The jars are procurable from Messrs. Osler, Broad Street, Birmingham. Treacher Collins in order "to show up more of the details of the specimens, and also to add to their general effectiveness, cements a plano-convex lens on the jars by means of Canada balsam."

Nettleship employs for imbedding—

Glycerine	250
Gelatine	250
Creosote	1

The interstices of the eyeball are filled with the mass, and the specimen is enclosed in an air-tight jar.

Instructive preparations can be simply made by placing a thick section of the eyeball on a disc of opal glass, pouring a little glycerine jelly over it, and, finally, laying gently on the top a plano-convex lens, taking care to exclude all air bubbles, much in the same way as one lays a cover-glass on a microscopic specimen.

2. Dry Method.

The bulb is fixed and hardened in alcohol in the usual manner. It is then divided suitably, and the parts, having been thoroughly dehydrated, are soaked in oil of turpentine for at least eight days, till they become transparent. They are now removed from the turpentine and placed in a vessel partially protected from the air, so that the turpentine evaporates slowly. When the specimen is dry, it will keep for an indefinite length of time ; it only requires to be protected from dust.

When examined with a lens, preferably a binocular lens or a binocular microscope, the ciliary body, the spaces of Fontana, and the zonule of Zinn, present pictures of great beauty.

Hyrtl's Method.—Hyrtl pierced the optic nerve, converting it into a tube along which the contents of the eye were expressed. The globe, now reduced to cornea and sclera, was then inflated and dried. The method is only of historic interest, since the specimen reveals nothing but the size of the organ.

3. Preservation in Formalin.

Formalin possesses the property of maintaining the transparency of the cornea. It is, therefore, suitable for preserving specimens exhibiting affections of this structure and of the anterior chamber, or those in which it is desired to examine newly formed vessels in the cornea.

Preparations showing the latter are easily produced. The cornea of a rabbit, if infected with pathogenic aspergillus spores, is soon invaded by new vessels, which run in from the limbus. The eye is then enucleated, and divided through the equator ; or the cornea is excised *in toto*, stained with eosin, and imbedded in Canada balsam. Under a low power the delicate network of vessels is revealed (Straub, *Achiv für Augenheilkunde*, Bd. XXXVII, S. 2).

Formalin renders the lens opaque.

It is suitable for preserving specimens of almost every kind. If, however, the tissues are intended for microscopic examination, they should not be left unduly long in formalin, because they become too hard for cutting with the microtome.

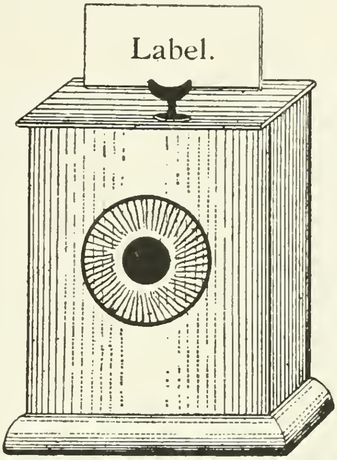

FIG. 5.—Jar for Museum Specimen.

For demonstration purposes the eyeball, after being hardened and divided, is enclosed in a jar with flat sides (see Fig. 5).

The preparation is first placed in distilled water for a few minutes, whether it has been hardened in alcohol or formalin. Some fine gelatine is dissolved in water at a gentle heat, and by means of this the preparation is fastened with its back to the posterior wall of the jar. As soon as the gelatine has become solid, the vessel is filled to the top with alcohol, or with a 3 or 4 per cent. solution of formalin. The upper margins of the jar are coated with gutta-percha cement, and the lid is warmed and applied, so as to exclude air. A clasp for the label is fastened to the cover.

(*To be continued.*)

CURRENT LITERATURE.

NOTE.—Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—EXPERIMENTAL INOCULATION OF THE VITREOUS HUMOUR WITH ASEPTIC FOREIGN BODIES.

Bartolotta.—The behaviour of the vitreous in the presence of aseptic foreign bodies. (Comportamento del vitreo in presenza di corpi estranei asettici.) *La Clinica Oculistica*, Febbraio, Marzo, Aprile, Maggio, and Giugno, 1912.

In this long communication, **Bartolotta** abstracts the results of a large number of experiments which he has made upon the behaviour of the vitreous in the presence of aseptic foreign bodies.

The first part of the paper is given up to a discussion of the anatomy of the normal vitreous, and the author concludes that the vitreous consists of a close network of fibrils which fuse with one another as they cross and at the surface with the hyaloid membrane ; the meshes of this network are filled by the vitreous humour, a fluid entirely similar to the aqueous.

In his experiments, Bartolotta has introduced foreign bodies into the eye by various routes, as through the sclerotic, through an iridectomy wound, through the pupil after removal of the lens, and, finally, through the pupil and the suspensory ligament, without damaging the lens. The last operation was possible only in large animals.

He made several series of observations, the first with inert organic substances, as sterile catgut, silk, etc. The eye did not appear to resent these substances at all, and the animals seemed to suffer no inconvenience. In one typical case, microscopic examination showed the vitreous detached from almost the whole of the retina, and somewhat shrunken behind the lens. The fibres of the vitreous around the region in which the silk was lying were almost entirely missing. A little granular *detritus* seemed to represent them. The fibres of the vitreous were broken up wherever they had come in contact with the foreign body. In another case the vitreous chamber was divided into two parts : the one occupied by vitreous, which still seemed normal, and the other practically empty, being occupied only by the small remains of broken-up fibrils. But even around the empty space the hyaloid membrane was still distinctly seen.

In a second series of experiments, inert inorganic foreign bodies, as fragments of glass or stone, were introduced by the same methods into the vitreous. These experimental animals suffered no more than in the previous experiments. In the examination of the eye, it was, of course, necessary to remove the foreign body before microscopical sections could be cut, and Bartolotta thinks he was able to do this without in any way damaging the vitreous. In cases in which he employed hyper-coloration by hæmatoxylin, it was easy with the naked eye to distinguish three zones in the vitreous : the first in immediate contact with the foreign body, very transparent and pale ; a second narrow zone, outside this, less transparent, but not deeply stained ; and a third external zone, deeply stained, and consisting of absolutely normal vitreous. The sole microscopical change in the innermost zone was a breaking-down of the fibres of the vitreous. In the second zone, the fibres are more densely arranged and there are some wandering cells. The fibres show no alteration from the normal and their greater density appears to be only a mechanical result of the presence of the foreign body. The longer the time that elapses between the introduction of the mass and the examination, the fewer are the wandering cells in the vitreous.

When oxidizable metals were used, the results were very different and varied with the nature of the metal. In the case of iron, the products of oxidation are fixed in the eye, while the copper compounds, being soluble, are carried off as soon as formed. The presence of oxidizable metals within the eye excites a turbidity of the vitreous in a few days or hours, and this turbidity spreads rapidly until the whole vitreous becomes opaque and breaks down more or less completely. The retina in most cases became detached, and under it was found a thin exudate.

Next, portions of animal tissues were employed, and the eye tolerated these completely. The fibrils of the vitreous were broken up by the introduction of the foreign body, but there was no other change.

In the last series of experiments, chemical solutions were introduced into the vitreous by means of silk threads or by a syringe. The substances used were perchloride of iron, acetate of lead, chloride of gold, and nitrate of silver. The fibres of the vitreous with which the substances came direct into contact were destroyed. In the case of nitrate of silver the whole vitreous became cloudy.

Bartolotta comes to the following conclusions.—

That the vitreous is made up of highly differentiated fibres, which have their origin in the mesoderm, and arrive at their position only during a certain period of development. When these fibrils have reached their full development, they are capable of no further reproduction or multiplication. The adult vitreous is not in relation with any tissue capable of furnishing to it any new elements, nor does it contain within itself any imperfectly developed elements which can replace the adult fibrils. It is therefore easy to follow that this tissue is not subject to the ordinary rules of inflammation, but can react by destruction, degeneration, and resorption of its network of fibrils. The vitreous humour never shows any alteration except in the presence of easily diffusible bodies, either introduced or proceeding from the oxidation of foreign bodies. When the fibrils have broken down, there comes to the vitreous a crowd of leucocytes, whose function it is to carry off the waste products of the destruction.

H. GRIMSDALE.

II.—MAGNETS, FOREIGN BODIES, AND X-RAYS.

(1) **Sharp, Walker N.—Successful removal of a piece of iron from the vitreous.** *Archives of Ophthalmology*, November, 1910.

(2) **Haab, O.—The new giant magnet made by the Oerlikon Factory, Zürich. (Der neue Augenmagnet der Maschinenfabrik Oerlikon bei Zürich.)** *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1910.

(3) **Randolph, R. L.—Two cases in which the X-rays failed to locate a foreign body which was afterwards shown to be present in the eye.** *Ophthalmic Record*, March, 1911.

(4) **Zimmermann, W.—Foreign body in the crystalline lens. (Fremdkörper in der Linse.)** *Klin. Monatsbl. f. Augenheilkunde*, Juli, 1911.

(5) **Genet.—What to do in cases where there is a magnetic foreign body in the retina. (Conduite à tenir en présence d'un corps étranger magnétique de la rétine.)** *Revue Générale d'Ophtalmologie*, 31 juillet, 1911.

(6) **Gallemaerts.—A new magnetometer model. (Un nouvean modèle de magnétomètre.)** *Archives d'Ophtalmologie*, août, 1911.

(7) **Haab, O.—On the magnet operation. (Ueber die Magnetoperation.)** *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1911, S. 2.

(8) **Alt, Adolf.—Phantom foreign bodies within the eye.** *American Journal of Ophthalmology*, December, 1911.

(9) **Gifford, H.—An aid to the localization of foreign bodies in the eye.** *Ophthalmic Record*, January, 1912.

(1) **Sharp** removed a piece of iron, 4 by 2½ by 1 mm., from the lower and inner part of the fundus of a boy's left eye, by incising the sclera through the internal rectus, and then using the Johnson magnet. The iron had entered through the cornea, but, avoiding the lens, had reached the inner part of the fundus, whence it dropped to the position at operation. The lens escaped any damage, and vision was 15/15 after the removal. No vitreous escaped. The only abnormality of vision left was a partial scotoma of the left temporal region. ROSA FORD.

(2) **Haab** (Zürich).—This new giant magnet has already been fully described in these columns. T. HARRISON BUTLER.

(3) The cases described by **Randolph**, of Baltimore, showed every clinical evidence of a retained foreign body, but the X-ray photographs were negative. After excision of the eyeball, the foreign body was found, in one case imbedded in the ocular coats half an inch to the nasal side of the optic nerve, and three-fourths of its length protruded into the orbital tissues behind the eye. In the second case the foreign body, an irregularly shaped bit of steel, was situated far back in the vitreous, surrounded by a mass of exudate. Randolph suggests that such cases, as soon as they are seen, should be subjected to several exposures with different positions of the tube.

J. JAMESON EVANS.

(4) **Zimmermann's** patient showed a posterior synechia and a peculiar reflex of the crystalline lens in the left eye; vision was 5/35. A fine corneal scar was made out with difficulty, and although the patient could not recall an injury, the diagnosis was made of a foreign body in the lens. The giant magnet having failed to produce any effect, preparatory iridectomy and artificial maturation were performed. As the removal of the lens in its capsule was very desirable, the operation of Smith was carried out with success, and without the loss of vitreous. A small piece of coal was found embedded in the lens. C. MARKUS.

(5) **Genet's** article deals with three specific cases of magnetic foreign body in the retina. These cases form the scaffolding for general remarks on the treatment which should be undertaken. The author employs the giant magnet of Rollet, of Lyon, which was described fully in THE OPHTHALMOSCOPE for August, 1911, page 580. Reference is made to the extremely interesting experiments of Rollet, which show how the foreign particle

comes round the lens when attracted by a giant magnet placed over the cornea with the object of extracting by the corneal route. Reference to THE OPHTHALMOSCOPE for August, 1911, (page 592), where Rollet's article is abstracted, may be made for many interesting points in connection with the subject of the magnetic properties of various steels. Genet follows Rollet in preferring the corneal route to the scleral in the extraction of magnetic foreign bodies. ERNEST THOMSON.

(6) **Gallemaerts**, of Brussels, has improved on Gérard's magnetometer by increasing its stability, facilitating its regulation, and increasing the sensibility of the indicator. The increase in the stability of the instrument has been achieved by replacing the tripod stand with a marble slab resting on four adjustable screws. The regulation of the indicator to zero has been facilitated by replacing the single magnet, which in the original instrument is situated between the indicator mirror and the scale with two small magnets. One of these is placed horizontally, and is movable in a vertical direction and about a vertical axis; it is destined to combat terrestrial magnetism, and is therefore set north and south. The other magnet is movable along the horizontal bar (as in the original instrument) between the indicator mirror and the scale; it is set at right angles to the mirror, and is movable in a vertical direction; its object is to counteract any magnetic influences which may act upon the indicator.

To increase the sensibility of the instrument, the single indicator needle is replaced by three small magnets superimposed pole to pole. The case containing the indicator is surrounded by a ring of copper 1 cm. thick; this effects control of the oscillations produced by currents set up in the metallic mass.

Notwithstanding the obvious difficulties attendant on the use of such an instrument in any situation where electric cables for the conduction of light or power are near at hand, Gallemaerts speaks highly of its value and says, "I know of no method surer, more rapid, and less harmful in the diagnosis of the presence of magnetic bodies in the globe." BERNARD CRIDLAND.

(7) **Haab**, of Zürich, first alluded to the bad results published by Stedman Bull. He regretted that Bull's death prevented him obtaining more exact information regarding these cases; it was important to know the total number of cases operated upon, a fact not stated in Bull's communication. Probably, the magnet used was not the new Oerlikon model, nor was the procedure that perfected at Zürich. To detach small particles of steel from the viscous tissues in which they might be imbedded, a powerful instrument was essential; in fact, it could not be too strong. It was far better to place the magnet centrally to the cornea and draw the splinter up the lens. It would then glide laterally, pass the zonule, and bulge the iris forward. To avoid imbedding it in iris tissue, the current must be sharply cut off; to this end a foot switch was absolutely necessary. The patient, too, feels pain at this moment, and draws his eye away; this is useful, and so the patient should not be operated upon lying on a table, but sitting on a chair with his head free. At this stage care and patience were demanded to guide the fragment into the anterior chamber. As soon as it had passed into the anterior chamber, a small incision must be made into the cornea and no aqueous allowed to escape. The point of the magnet must be introduced into the wound and the current switched on. Scleral incision is very undesirable, and is often followed by retinal detachment. It is, however, occasionally indispensable. In these cases *the point of the magnet must be placed in the wound*, and then in most cases extraction is easy. It is quite unnecessary, says Haab, to waste any time in trying to localise the fragment either with the sideroscope or the X-rays.

Discussion.

Pfalz, of Düsseldorf, pointed out that as the patients generally came to the clinic days, and even weeks, after the accident, it was of small moment to save the few minutes which were necessary to localise the fragment with Asmus' sideroscope.

Stölting, of Hannover, thought that before any operation was attempted, an exact localisation should be made.

The position taken up by Haab appears to the reviewer to be somewhat too dogmatic. A large splinter lying upon the retina can be removed through the sclera with less damage to the eye than if it be drawn into the anterior chamber. T. HARRISON BUTLER.

(8) An X-ray plate showed nine small dark shadows apparently in the eye. The child's globe had been penetrated in the sclero-corneal junction by some injury, the exact nature of which could not be determined. The discovery caused, of course, considerable anxiety. Xeroform powder was being used to the injured eye, and it occurred to **Alt**, of St. Louis, that the peculiar foreign bodies lying apparently within the eyeball might be merely the shadows of bismuth contained in the xeroform powder. This supposition turned out to be correct. SYDNEY STEPHENSON.

(9) **Gifford**, of Omaha, is in favour of the method of fixed limbus localisers, such as those described by Holth in THE OPHTHALMOSCOPE for August, 1911. He has for years used a similar method (published in *The Western Medical Review*, August, 1911), but instead of using specially prepared buttons with three holes, he uses small bits of brass or silver wire, which are tucked into a conjunctival pocket at the upper and lower corneal margins. This method has the advantage over Holth's and Fox's that no special appliance is required, as pins and nippers are generally at hand.

J. JAMESON EVANS.

III.—PATHOLOGY.

(*Fifth Notice.*)

(1) **Komoto, J.—Solitary tubercle of the optic nerve head. (Ein Beitrag zur Solitärtuberculose des Sehnervenkopfes.)** *Klin. Monatsbl. f. Augenheilk.*, Januar, 1912.

(2) **Dulcos, A.—Lobulated squamous epithelioma with epidermic cell nests developed from a dermoid tumour (embryoma) of the limbus. (Epithélioma pavimenteux lobulé à globes epidermiques développé aux dépens d'une tumeur dermoide (embryome) du limbe.** *Ann. d'Oculistique*, janvier, 1912.

(3) **Posey, Wm. Campbell.—Small round-cell myosarcoma with extension into eyeball.** *Ophthalmic Record*, February, 1912.

(4) **Stoewer, P.—Malignant nævus of the caruncle. (Maligner Naevus der Karunkel.)** *Klin. Monatsbl. f. Augenheilk.*, Februar, 1912.

(5) Suganuma, S.—A contribution to our knowledge of the pathology of pigmentary degeneration of the retina. (Ein Beitrag zur Kenntnis der Pathologie der Pigmentdegeneration der Netzhaut.) *Klin. Monatsbl. f. Augenheilk.*, Februar, 1912.

(6) Rollet and Aurand.—Experimental researches on gonococcal ocular infections. (Recherches expérimentales sur les infections oculaires par le gonocoque.) *Revue Générale d'Ophtalmologie*, 31 mars, 1912.

(7) Koyanagi, Y.—A case of primary tumour of the optic nerve. (Ueber einen Fall von primären Sehnerventumor.) *Klin. Monatsbl. f. Augenheilk.*, März, 1912.

(8) Komoto, Gunjiro.—A contribution to the pathological anatomy of so-called preretinal hæmorrhage. (Ein Beitrag zur pathologischen Anatomie der sog. präretinalen Blutung.) *Klin. Monatsbl. f. Augenheilk.*, März, 1912.

(9) Nakaizumi, Y.—A contribution to the pathological anatomy of retinitis cachecticorum ex carcinoma ventriculi. (Ein Beitrag zur pathologischen Anatomie der Retinitis cachecticorum ex Carcinoma ventriculi.) *Klin. Monatsbl. f. Augenheilk.*, März, 1912.

(10) Hussels.—A contribution to the pathological anatomy and the pathogenesis of glaucoma. (Ein Beitrag zur pathologischen Anatomie und Pathogenese des Glaukoms.) *Zeitschrift für Augenheilkunde*, März und April, 1912.

(1) The case reported by **Komoto**, of Tokio, was as follows.—A girl, aged ten years, without tuberculous family history, suffered from fever, accompanied by redness of the left eye, photophobia, and headache. One month later, there was swelling of the upper lid, slight injection of the whole conjunctiva, diffuse opacity and loss of lustre in the cornea, pericorneal injection, and posterior synechiæ. The lens was clear, and behind it grey folds were visible. Vision was *nil.* Tuberculin reaction was positive. The eye was enucleated. In sections there was seen to be total detachment of the retina, which formed a funnel tapering posteriorly. At the bottom of the funnel a mass was found, occupying the nerve head and neighbouring retina, the infiltrated retina being folded over the main mass. The choroid and peripheral parts of the retina were infiltrated with lymphocytes and other cells, but there were no giant cells in these situations.

After reviewing the details of published cases of tubercle of the nerve-head, Komoto states that they may be divided into three classes, *viz.*, (1) Optic neuritis with partial swelling; (2) Distinct swelling of the disc spreading partly into the neighbouring retina, without severe choroidal or retinal complications or glaucoma. This may be difficult to diagnose from tumour or syphilis of the papilla or parapapillary tubercle of the choroid; (3) A mass at the papilla with detachment of the retina, leading to secondary glaucoma, and inflammatory changes in the iris which may be complicated with recurring hyphæma. A. J. BALLANTYNE.

(2) **Duclos** gives a detailed account of the microscopical structure of a tumour removed from the limbus of the eye of a child aged ten years. This proved to be an epithelioma, which had developed from a congenital dermoid.

R. J. COULTER.

(3) **Posey,** of Philadelphia, describes a case of myosarcoma of the right orbit in a girl, fifteen years of age, who had considerable exophthalmos of the right eye when fourteen months old, but for fourteen years this had practically

disappeared, leaving only a tendency to enlargement of the palpebral aperture after exertion or extreme fatigue. When seen in 1910 by the writer, the proptosis had recurred, was increasing, and was associated with sense of fulness in the orbit, dimness of vision, marked restriction of movements of the globe, papillo-macula œdema, with tortuosity and distension of the retinal vessels. R.V. = 3/60, L.V. = 5/5. L.E. normal. The right field was concentrically contracted, but no scotomata could be outlined. In a few days, the proptosis increased, vision depreciated, and bulbar chemosis and venous congestion of the conjunctiva appeared, and it was decided to exenterate the orbit after exploration by Krönlein's orbital resection. Twenty-one months after the operation, there was no evidence of recurrence.

The growth consisted of a series of four cylindrical encapsuled portions, each of about 11 × 7 mm. × 1 cm. in size, of pale pinkish-brown colour, of a rather firm and elastic consistency, and surrounded by fibro-cicatricial tissue, cellular tissue, and fat.

Microscopically, the masses were found to consist of striated muscle fibres, enclosed within a sarcolemma, with fibrous tissue capsules, polymorphonuclear infiltration, granulation tissue masses, round cell infiltrates, and in one small area, small round sarcoma cells. The eyeball, though normal in appearance, showed microscopically a dense mass of non-pigmented spindle cells, filling the lumen of a vortex vein. The internal surface of the vessel was covered with choroidal chromatophores. The pointed internal end of the spindle cell mass was also deeply pigmented, and around it there was proliferation of the choroidal stroma pigment cells. The ciliary body, contiguous to the diseased area, was enlarged, owing to increase in the cells of the muscle layer, and the vessels, although structurally perfect, were filled with sarcomatous cells of an endothelial type.

Pathologically, the growth was regarded as a myosarcoma, originating as an endothelial sarcoma in the blood-vessels of the orbit, rather than in those of the eyeball, whereby the vision would have been more quickly affected, and the progress of the growth much more rapid. Another view held was that the growth was an endotheliomatous sarcoma, starting in the eyeball, and that the changes in the orbit were secondary, and of a chronic inflammatory type.

J. JAMESON EVANS.

(4) **Stoewer**, of Witten, describes a pigmented tumour of the caruncle in a young woman, removed under the impression that it was a melanotic sarcoma. The appearance microscopically of epithelial involutions and sub-epithelial nævus cells caused the diagnosis to be revised. The pathological details need not be summarised. The case, unfortunately, does not throw any light on the source of the nævus cells. A. J. BALLANTYNE.

(5) **Suganuma**, of Niigata, Japan, reports the case of a man sixty-seven years of age, affected with typical retinitis pigmentosa. One eye received a wound, the iris prolapsed, and hypopyon developed. The eye was perforating, and it was therefore excised, and the author gives a detailed account of the microscopic changes found in the retina and choroid. Briefly, these were as follows.—Progressive sclerosis of the retinal vessels, atrophy of the nervous elements of the retina, pigmentation of the retina, hyperplasia of the supporting structures, and slight atrophy of the choroid. The retinal pigment layer was normal at the posterior pole and at the periphery, but in the equatorial region its cells were of variable size, and the degree of pigmentation was irregular ; in places the layer was absent, and in other places it consisted of several layers of cells. Here and there bud-like processes of the retinal pigment layer projected forwards into the retina. The pigment granules were of spherical form, of varying sizes, and abnormally dark pigment was found in all the retinal layers as

(1) stellate pigmented cells, (2) pigment clumps in the tissue spaces, and (3) strands of pigment-epithelial cells accompanying the sclerosed vessels. The sclerosis found in the choroid was of the senile form, and the choriocapillaris was normal. This case, therefore, lends no support to the theory that the disease of the retina is due to atrophy of the choriocapillaris. Since, wherever he found patent blood vessels, the retinal tissues were comparatively well preserved, Suganuma assumes that either the degeneration of the vessels precedes that of the tissues, or else these two undergo a simultaneous change.
J. W. BALLANTYNE.

(6) **Rollet and Aurand**, of Lyons, with the view of supplementing the work of Byers, of Montreal, on the intraocular complications of gonorrhoea in man, have experimented on the rabbit by inoculations of cultures of gonococcus into the anterior chamber, into the iris, ciliary body, choroid, vitreous, and optic sheath; and of gonotoxin into the anterior chamber, vitreous, and sheath. It is true that Christmas, in the Pasteur Institute, found that the gonococcus developed badly in the rabbit, and died out readily even when injected into the anterior chamber. Christmas considered that this result was due to the high temperature of the rabbit (39° C.). Not having any other animal available, however, Rollet and Aurand employed this animal in their investigations, and have not regretted doing so. They conclude that the gonococcus is pathogenic for the rabbit under certain conditions; that in this animal, as in man, the organism affects the uveal tract and causes exudates in the anterior chamber, and even hypopyon and vitreous opacities. It seems to have an elective toxic action on the retinal neuro-epithelium and on the optic nerve. In man one knows of metastatic optic neuritis and retinitis due to gonorrhoea. The lesions seem due rather to the toxine than to the organism itself, for the latter has never been recovered from the eyes of the rabbits any more than from the eyes of man.

Spontaneous cure, where the inoculation of cultures or of toxines has been made into the anterior segment of the eye, seems to be a constant for the rabbit, owing to its high temperature. Some of the inoculations of cultures or toxines were followed by accidents at a distance, such as intestinal gangrene, submaxillary suppuration, small abscesses of the liver, or by cachexia or death due to general intoxication. ERNEST THOMSON.

(7) The great majority of published cases of primary tumour of the optic nerve have been described as myxosarcoma, and these, with the others diagnosed as sarcoma and fibrosarcoma, make up 65 out of 118 published cases, while glioma only accounts for 13. Some authors, however, hold the opinion that many of the cases described as myxosarcoma are, in reality, gliomata. The case reported by **Koyanagi**, of Kyoto, is offered as a contribution to the solution of the question. The tumour tissue occupied the interseptal parts of the nerve, the cells being spindle shaped, but many of them, as seen in smear preparations, multipolar. The intercellular substance consisted of a fibrous network and a homogeneous gelatinous material. There were no normal nerve fibres remaining. While the spindle cells and the homogeneous material in the matrix, according to the views of some authors, point to the diagnosis of myxo-sarcoma, the absence of involvement of the septal tissue and the presence of multipolar cells are in favour of glioma. Moreover, the homogeneous material is found not to be mucous in character, and a similar material has been found in gliomata of the central nervous system. Koyanagi therefore considers that this is a glioma, and favours the view that some cases hitherto described as myxosarcoma have belonged to the same category. A. J. BALLANTYNE.

(8) The case described by **Komoto**, of Kyoto, is that of a man, 17 years

of age, who suffered from the hæmorrhagic diathesis. After unusual exertion, he became ill with fever, headache, pains in the limbs, and a universal petechial eruption on skin and mucous membranes. The issue was fatal. Four days before death there were, besides a few conjunctival hæmorrhages, numerous small retinal hæmorrhages in both eyes.

The left eye was removed at the necropsy, and submitted to examination. The small hæmorrhages seen during life could not be detected with the naked eye, but there was a very large one over the macula, and a smaller one down and in from the disc. The extravasation was found to be largely composed of blood corpuscles and masses of fibrin. It was bounded in front by the limitans interna, and therefore was, strictly speaking, inter- rather than pre-retinal. The same remark apparently applies to the majority of published cases of "preretinal" hæmorrhage. The author has found records of three true cases of preretinal hæmorrhage, and in two, if not three, the hæmorrhage occupied the area immediately surrounding the disc. The changes, other than hæmorrhage, which were found in Komoto's case were collections of "ganglionic" nerve fibres in the neighbourhood of the hæmorrhage; folding of the retina at the margins of the hæmorrhage, probably accounting for the bright curved line seen near the margin of such hæmorrhages; and clumps of leucocytes, which may account for the punctate and striate figures described as visible on the anterior surface of the hæmorrhage in some cases. A. J. BALLANTYNE.

(9) **Nakaizumi**, of Tokio, deals, in considerable detail, with the case of a man, aged 56 years, who manifested during life gastric symptoms and profound anæmia, with increasing cachexia. Ophthalmoscopic examination two days before death, showed pallor of the fundus, disc, and vessels, a number of small punctate hæmorrhages between the disc and macula, and round the disc, numerous white glistening specks and greyish-white spots and patches. The necropsy revealed carcinoma of the pylorus with metastases in the peritoneum and liver.

For the details of the microscopic description, the survey of the literature of retinal changes in such cases, the classification of, and methods of differentiating, fatty substances found in the retina, the reader is referred to the original. The following are some of the author's conclusions.—The retinal changes of retinitis cachecticorum ex carcinoma ventriculi resemble those of other pernicious anæmias. They include hæmorrhages and white spots, which have not a typical arrangement like that of albuminuric retinitis. The condition is not inflammatory. The white spots are due to the so-called "varicose hypertrophy" of the nerve fibres, and to the presence of fatty substances. The glittering appearance, seen in some of them, only appears with the onset of fatty infiltration. Varicose hypertrophy is really a degenerative change, and varicose swelling would be a better name. The fatty substances are mostly doubly refracting, and belong to the groups of the cholesterin esters and the phosphatides. They arrive at the retina by "exogenous" routes, in the last stage of cachexia, and possibly when a state of lipæmia has set in. The retinal changes are due partly to disturbances of nutrition and partly to the action of toxic substances in circulation.

A. J. BALLANTYNE.

(10) **Hussels**, of Marburg, contributes a long article, continued into two numbers of the *Zeitschrift*, which is entirely devoted to the histology of a glaucomatous eye. The conditions found were partial adhesion of the iris to the cornea, half of the iridic angle being open; sclerosis of the pectinate ligament and blocking of its meshwork with pigment and other cells; hypertrophy of the ciliary processes and thrombosis of the central retinal vein. This thrombosis was the probable cause of the acute inflammation in

an eye affected with glaucoma simplex. The nerve head was completely excavated, every trace of nerve tissue had disappeared. There was much hypertrophy of the glia, and glial nuclei were very numerous. The *lamina cribrosa was not displaced backwards* in spite of the great excavation. Schnabel's cavernous atrophy was well marked. There was general arterial sclerosis.

T. HARRISON BUTLER.

IV.—TUBERCULOSIS OF THE CONJUNCTIVA.

Eyre, John W. H.—On tuberculosis of the conjunctiva: its etiology, pathology, and diagnosis. *Lancet*, May 18th, 1912.

We shall endeavour to summarise **Eyre's** masterly Hunterian lecture on tuberculosis of the conjunctiva.

The lecturer first gave a definition of the condition as an "infective granuloma affecting the conjunctival tissues, whether bulbar or palpebral, due to the local multiplication of bacillus tuberculosis and to the action of the toxins it elaborates. Clinically its manifestations are protean; histologically its basis is the giant cell system, although in some instances the surrounding hyperæmic granulation tissue completely masks the fundamental 'tubercle.' Passing to the question of phlyctenular conjunctivitis, Eyre sees no valid reason for regarding it, *per se*, as a form of tuberculosis of the conjunctiva. Nevertheless, both phlyctenules and chalazion may, on occasion, serve as the portal of entry to the tubercle bacillus.

After this follows an historical summary which need not detain us at present, and then some details of the case incidence. The frequency figure obtained from the records of various observers varies enormously, from 1 in 1,600 new cases to 1 in 30,000. The author's own figure is 1 in 3,200, or eliminating re-admissions, 1 in 2,700 to 1 in 2,500.

The question of *diagnosis* is next attacked. Under the heading *Clinical Methods* are discussed the clinical types and the differential diagnosis. The clinical types are recognised to be five in number. Their relative frequency in a series of analysed cases came out as follows:

Group I.—Ulceration	46
Group II.—Miliary tubercle...	25
Group III.—Hypertrophic granulation	80
Group IV.—Lupus	46
Group V.—Pedunculated tumour	9

The features of the various clinical types are then discussed in minute detail which must be sought in the original. After this comes an account of the various clinical methods of demonstrating hypersensibility towards the toxins of the tubercle bacillus, namely, the cutaneous reaction (von Pirquet), the dermal reaction (Lignières, Lautier, Woodcock, or Moro), the intradermal reaction (Mantoux), the subcutaneous test (Koch), and the ophthalmo-test (Calmette). The results of treatment form a further method of diagnosis.

Under the heading *Laboratory Methods* of diagnosis are discussed the microscopical and bacteriological examination of the local lesions with a view to the detection of the bacillus, and the biochemical examination of the patient's blood serum with a view to the detection of specific antibodies. These subjects are, of course, highly technical and must be studied in the original.

Passing on to the *Ætiology*, the author discusses the predisposing and exciting causes. With regard to the former he says:—" In many infective diseases a careful consideration of the causes which may possibly influence infection, such, for example, as sex, age, &c., will afford valuable information, but in the case of tuberculosis of the conjunctiva the only feature which stands out with any degree of prominence is that the disease affects individuals chiefly during the early years of life. In this respect, however, it differs in no wise from tuberculosis in other situations."

Dealing with the *exciting cause*, Eyre, after discussing the morphology of the human and bovine types of tubercle bacillus, gives a table which shows that in his own cases the human bacillus of tubercle is assumed to be responsible for at least 62 per cent. and the bovine for about 17·2 per cent. In the remainder the material was lacking or the result of the examination was doubtful.

The *Paths of Infection* may be exogenous or endogenous. Under the former we have direct extension by continuity of surface from pre-existing tuberculous lesions, as takes place in lupus and direct inoculation of the conjunctiva. After enumerating the reasons for his belief that direct local infection takes place, the author says: – " So that my previous opinion as to the pathology of tuberculosis of the conjunctiva of the first, second, and fifth types remains unaltered; that is to say, it is practically always the result of the direct inoculation of tubercle bacilli, possibly (1) between the interstices of of the epithelial cells of an apparently normal conjunctiva. . . . . (2) into a broken down phlyctenule; (3) into an occluded or possibly a ruptured Meibomian gland; and (4) into some abrasion or other slight trauma." For various reasons, which he enumerates, Eyre regards the endogenous method of infection as possible but extremely rare.

In a short paragraph the *treatment* is referred to. We may give a portion or it in the author's words:—" Since then (*i.e.*, when writing fifteen years ago) my views have undergone some modification. I still advocate the complete removal of the local lesion if that can be done without risk of subsequent scarring and disfigurement, or of injury to the globe, in cases coming under Groups II. and V. Also in Groups I. and III any scraping and cutting that will remove any considerable portion of the diseased tissue without involving similar risks should certainly be carried out, but, in addition, I strongly advocate the administration of Koch's tuberculin T.R. Carefully administered by the skilled observer the conjunctival lesions become absorbed—indeed, they may almost be said to melt away—and the conjunctiva returns to its original normal condition. Scarring and deformity are avoided. The infected glands, preauricular and submaxillary, also undergo resolution in most instances, although sometimes, if caseation has taken place before the case comes under observation, they will need opening and clearing out . . . Since my first case in 1907 . . . I have employed tuberculin in 10 others, making 11 in all. Of these 11 cases one, lupus of the conjunctiva . . . was much improved and has not relapsed in the twelve months that have elapsed since he took his discharge, and one has only just commenced treatment. A third, lupus of the conjunctiva, extending in this instance from the nasal mucous membrane, was not benefited in the least . . . The remaining eight cases have been completely cured after treatment extending over periods varying from four to fourteen months. The tuberculin used has been Koch T.R. (human) in ten of the cases. My initial dose has been as small as 1/20000 mgr. and my maximum dose has never exceeded 1/2000 mgr. The intervals between the doses have varied from seven days to three weeks."

ERNEST THOMSON.

V—EROSIO CORNEÆ.

(1) **Kraupa, E.**—Erosion of the cornea caused by the sting of a wasp in the lid. (Erosio corneæ durch einen Wespenstachel im Lide.) *Centralbl. f. prak. Augenheilkunde*, November, 1911.

(2) **Purtscher, O.**—Erosion of the cornea caused by the sting of a bee in the lid. (Erosio corneæ durch einen Bienenstachel im Lide.) *Centralbl. f. prak. Augenheilk*, Dezember, 1911.

(1) **Kraupa**, of Prague, reports the case of a bee keeper who, while attending to a hive, was stung in his right upper lid by a bee or wasp, he could not be certain which, but he said he was almost immune to the stings of bees, and as this one caused very great pain and swelling of the lids, he assumed it was a wasp. After the subsidence of the acute symptoms, he had attacks of pain in the right eye, especially on closing his lids or on looking upwards, and when examined, was seen to have many erosions of the upper part of the cornea and a small swelling about the middle of the conjunctival surface of the upper lid. When this was examined carefully, a fine black point was seen, and there was withdrawn a wasp sting, 2¼ mm. long. It is unusual for a wasp to thus lose its sting, since, unlike the bee, it is a perfectly smooth needle-shaped instrument (the bee has backwardly directed hooks), but must have been broken off by the violent contraction of the orbicularis palpebrarum at the time of the prick.
A. LEVY.

(2) In connection with the report by Kraupa of a case of wasp sting in the lid, **Purtscher,** of Klagenfurt, saw an analogous case at the same time. A man, forty years of age, was stung in the left eye by a bee or wasp. The resulting swelling subsided in two or three days, but there remained a constant feeling of a foreign body in the eye. The cornea was rough in its upper half and the lid swollen, and at one point on its conjunctival surface was a localized swelling. In this was found the sting of an insect, but as it was lost, it is impossible to say whether it was that of a bee or a wasp. The patient made a prompt recovery. A. LEVY.

VI.—CATARACT OPERATIONS.

(1) **McKechnie, W. E.**—Cataract operations and the preparation of the surgeon. *Archives of Ophthalmology*, January, 1911.

(2) **Fernandez, Santos.**—The advantages of a conjunctival flap in the operation of simple cataract extraction. (Ventajas positivas del coljage conjuntival en la extraccion simple de la catarata.) *Archivos de Oftalmologia Hisp.-Amer.*, Marzo, 1911.

(3) **Sexe.**—Cataract extraction with double conjunctival bridge after preliminary iridectomy. (Procédé de sécurité à deux bordes conjunctivales après iridectomia préopératoire dans l'extraction de la cataract.) *L'Ophtalmologie Provinciale*, mars, 1911.

(4) **Taylor, S. Johnson.**—A Morgagnian cataract; operation; remarks. *Trans. Ophth. Society U.K.*, Vol. XXXI, Fasc. 2, p. 146, 1911.

(5) Vacher and Denis.—A practical method of avoiding section of the iris by the edge of the knife when operating for cataract. (Procédé pratique pour éviter dans l'opération de la cataracte la section de l'iris par le tranchant du couteau.) *Ann. d'Oculistique*, mai, 1911.

(6) Smith, Homer E.—An improved method for the extraction of the immature cataractous lens. *New York State Journal of Medicine*, May, 1911.

(7) Gifford, H.—On the necessity for extra care in the prognosis and treatment of diabetic cataract. *Ophthalmic Record*, May, 1911.

(8) Taylor, H. F. Lechmere.—Intra-capsular removal of cataract : experiences and suggestions. *Indian Medical Gazette*, Vol. XLVI, p. 210, June, 1911.

(9) van Lint.—The cataract operation with sliding of the conjunctiva. (Opération de la cataracte avec glissement de la conjonctive.) *La Clinique Ophtalmologique*, 10 juillet, 1911.

(10) Timberman, A. J.—Some observations and lessons of the Smith operation for cataract, based upon two hundred and seven cases operated upon in the clinic of Lieut.-Col. Henry Smith, Amritsar, India. *Ophthalmology*, July, 1911.

(11) Lukens, Charles.—Intra-ocular irrigation after cataract extraction· *Ophthalmology*, July, 1911.

(12) Nesfield, V., Captain I.M.S.—The division of the suspensory ligament of the lens as a preliminary to intra-capsular extraction of cataract. *Indian Medical Gazette*, Vol. XLVI, p. 262, July, 1911.

(13) Eason, Herbert L.—Notes on the extraction of cataract. *Lancet*, July 29th, 1911.

(14) Dutoit, A.—Researches upon Schmidt's single-stroke cataract section, with remarks on the two-stroke section. (Untersuchungen über den einzugigen Starschnitt nach Schmidt, nebst Bemerkungen über den zweizugigen Starschnitt.) *Zeitschrift für Augenheilkunde*, Juli, 1911.

(15) Keiper, George, F.—Operations for cataract upon the eyes of the very aged. *American Journal of Ophthalmology*, November, 1911.

(16) Fox, L. Webster.—The sliding flap in cataract operations. (van Lint's method.) *Ophthalmology*, January, 1912.

(17) Stanculeanu, G.—Intracapsular cataract operations. (Intrakapsuläre Staroperationen.) *Klin. Monatsbl. f. Augenheilk.*, Mai, 1912.

(18) Ellett, E. C.—Cataract extraction with corneal suture. *Southern Medical Journal*, June, 1912.

(1) **McKechnie** considers that the surgeon should refuse to operate if he is so much below par, by reason of nervousness or indisposition, that his hand is unsteady enough to produce gross vibrations of the point of the knife. To prevent such a condition, the surgeon should keep himself in good condition, especially avoiding late hours or a banquet the night before A sedative may control the condition sufficiently to permit operating. The knife should be held lightly and delicately balanced, and steel handles are to be avoided as too heavy.

McKechnie recommends that in all large eye clinics, 20 per cent. of the cataracts should be performed by the junior staff, under the direct supervision of a skilled senior, so that the number of eyes lost by those learning to operate may be reduced. Rosa Ford.

(2) **Fernandez** thinks that the importance of the conjunctival flap has not been properly appreciated, at all events by writers on ophthalmology; nothing prevents the reopening of the lips of the wound so well as a flap of this kind, and if we can avoid the reopening of the wound, we shall prevent also prolapse of the iris, which is the chief danger of this form of operation. He thinks it is superior to any form of suture in this respect.

Harold Grimsdale.

(3) **Sexe**, of Besançon, has found from experience that the operation must be adapted to the patient. He now precedes the extraction by fashioning two conjunctival bridges at the time of making the incision. He very briefly describes its performance; he also gives his reasons for preferring preliminary iridectomy. P. A. Harry.

(4) The moral of this case, by **Taylor**, of Norwich, appears to be that too much dependence must not be placed upon the faulty projection of light, especially when a cataract is of long-standing. That sign should not debar operation, particularly if tension be normal and the direct response of the pupil to light be brisk. Sydney Stephenson.

(5) **Vacher** and **Denis**, of Orleans, recommend the following procedure to avoid wounding the iris in cases in which it is pushed forwards in front of the knife during the section for cataract extraction.—1. Withdraw the Graefe knife. 2. Pass the iris repositor from the counter-puncture to the puncture between the cornea and iris, gently pressing the latter into position. 3. Re-enter the knife, using the repositor as a director. 4. Complete the section, fixing the eye by pressure of the repositor against the angle of the wound. R. J. Coulter.

(6) **Homer E. Smith**, of Norwich, N.Y., operates upon immature cataract in the following way.—The pupil having been fully dilated with a 2 per cent. solution of homatropine, the anterior capsule is opened cross-wise by means of a knife-needle, the point of which is ground-off, thereby making the blade of the instrument the shape of a miniature scalpel. The conjunctival sac is then flushed with an antiseptic lotion, and the patient, after having been given one quarter of a grain of morphia hypodermically, is put to bed, where he remains for four to six hours before the extraction itself is performed. The latter does not differ from the ordinary method, although the corneal section should be large. Delivery is always smooth, since in the interval the aqueous has caused a separation between capsule and lens. Briefly, then, Smith's modification simplifies the capsulotomy, one of the most important and difficult steps in the extraction of cataract. Sydney Stephenson.

(7) **Gifford**, of Omaha, Neb., is of opinion that no definite ætiological connection has been established between the diabetes of advanced years and the formation of cataract. The results obtained in operation for cataract in these cases are not much worse than those obtained in non-diabetics, the main difference being due to the liability to central retinal hæmorrhages. In the case of cataract associated with severe diabetes in younger people, say, under thirty years of age, it is quite a different matter. These patients generally die within a couple of years after the onset of the disease, and cataracts develop with great rapidity, sometimes in a week or two. With these cataracts the operative risks are much heavier, and Gifford records seven cases, of which two were lost from suppuration of the cornea, and one through severe iridocyclitis. It is possible that the operation for cataract may precipitate a fatal

issue from the general effects of the disease. His conclusions, with regard to the diabetic cataract of young people, are.—1. That it should not be operated on without letting the patient or the relatives understand that even if a good result is obtained, the patient will probably not live more than a year or so to enjoy it. 2. That the danger of a bad result is much greater than in ordinary cataract, and that it involves some danger to the patient's life. 3. That if a good result has been obtained in one eye, it is unjustifiable to operate on the other eye. J. JAMESON EVANS.

(8) **Taylor,** of Jalalpur-Jatlan, Punjab, India, has addressed himself to the problem of intracapsular extraction without the skilled assistant commonly considered essential. Without minimising the advantage of such an assistant, Taylor has been so situated, like many others, that he has had to attempt the operation without trained assistance, or leave it alone Any ordinary surgical dresser is quite competent to keep the lower lid depressed. Taylor has had to utilize his own left hand for the elevation of the upper lid and eyebrow. He has expressed the lens with the right hand alone. No very clear idea is given of the extent of the disadvantage of this one-handed expression. When vitreous presents or escapes, the lens has to be delivered with the vectis alone. And the removal of ruptured capsule must at times be somewhat unsatisfactory without some supporting pressure on the cornea.

Taylor uses Desmarres' retractor for the upper lid, and does not limit himself to any particular form of expressor. He is impressed with the special care needed to avoid iris prolapse after this operation, and uses an iris repositor very much bent, so that it can be passed up under the upper lid and employed with the eye turned upwards. He finds in not a few cases the iris apparently paralysed from the pressure it has undergone. He relates a case of loss of an eye in his own practice, from secondary infection due to prolapse, and realises that in India such disasters may be more common than many operators think. Owing to the usual absence of iritis after Smith's operation, atropin is commonly unnecessary in the after-treatment. Taylor instils physostigmine solution immediately after operation and continues it daily for the first few days. H. HERBERT.

(9) **van Lint,** of Brussels, enumerates the various modifications which have been made on the classical operation for cataract with the object of avoiding hernia of the iris and infection of the eyeball. Three methods are directed solely against hernia of the iris—namely, iridectomy, suture of the cornea, and the conjunctival bridge. Three methods seek to protect the eye against infection, while at the same time hindering prolapse of the iris. These are the conjunctival pocket (Czermak, Dimmer), the conjunctival purse-suture (Rohmer), and the pedunculated conjunctival flap (Kuhnt). Of these only one is in current use, *viz.*, iridectomy. Iridectomy is not a perfect method, and the author seeks to attain the double advantage of prevention of prolapse and of infection by the method of making a sliding conjunctival flap.

The eye is fixed by the method of Angelucci. In this method the superior rectus is grasped with fixation forceps, which at the same time keep the upper lid out of the way. The conjunctiva is detached all round the upper half of the corneal limbus, and is dissected from the sclera for eight or ten millimetres, *i.e.*, up to the position of the fixation forceps. Two threads are next placed in such a way that they will be able to draw the conjunctiva down over the upper quarter of the cornea. The operator then takes the fixation forceps, which up till now have been held by the assistant, and while the latter holds down the lower lid, the operator performs the extraction, knots the conjunctival threads at the horizontal meridian, and cuts them short. Physostigmine is instilled, to be followed at the first dressing, and subsequently if necessary, by atropine. The conjunctiva gradually retracts, and sometimes may have entirely left the cornea in forty-eight hours. Sometimes it slightly covers the cornea up to the fourth or fifth day, but in any case it serves its purpose in producing good co-aptation of the lips of the wound, and in preventing infection. According to van Lint, this method is suitable for all cases of cataract extraction, and is not to be regarded in any way as an exceptional method. ERNEST THOMSON.

(10) **Timberman** is an enthusiastic advocate of Smith's operation. Loss of vitreous, as seen in the practice of competent operators, is not an accident, but an incident, and is not a real objection to the operation. Contrary to one's expectation, the operation is practicable in cases with seclusion of the pupil. One of its greatest fields of usefulness is in the treatment of immature cataract. Another advantage is the freedom from iritis, or from the worst effects of iritis if it does occur. A. J. BALLANTYNE.

(11) **Lukens** favours the use of irrigation after extraction of cataract, but has found difficulty in ensuring the sterility of irrigators provided with rubber tubes or bulbs. He claims to have overcome the difficulty by using a syringe, like a large eye dropper, the barrel of which holds about six drachms, and the rubber bulb a little less. The barrel is filled in such a way that the solution does not come in contact with the rubber. A. J. BALLANTYNE.

(12) **Captain Nesfield** wrote a short paper on this subject in July, 1909 (*see* THE OPHTHALMOSCOPE, Vol. VII, p. 703). Since then he has divided the suspensory ligament over fifty times in operating for cataract on Assamese patients, and has done the same thing upwards of one hundred times on normal eyes on the dead subject. He now feels confident in stating that division of the lower segment of the zonule is a safe procedure, and greatly simplifies intra-capsular extraction, especially in those cases in which moderate pressure fails to expel the lens by Smith's method.

From *post-mortem* observations he states that the zonule is very strong in children, and that any tear produced in it remains localized in spite of external pressure upon the eye. By external pressure alone it is impossible to rupture the ligament without also bursting the hyaloid. Between twenty and thirty years of age the ligament still resists external pressure alone, but a tear in it tends to spread more readily. Even at the age of seventy years, he was unable to rupture the zonule by pressure, if the lens was clear. (This does not correspond with the Jullundur experience.—H. H.) He suggests that cataractous degeneration of the lens is accompanied by degeneration of the suspensory ligament. Also, he finds the intra-capsular expulsion of soft lenses more difficult than of hard lenses, because, when the lens is soft its anterior surface indents, whereas, if the lens is hard and resistant, it tends to move up the corneal wound, and to pull upon the lower portion of the suspensory ligament. Nesfield appears to have experienced more difficulty than most surgeons in expelling the lens by Smith's method, having failed in five out of every six cases.

For dividing the suspensory ligament, he uses a home-made zonulotome of silver wire. It has a tip $\frac{1}{16}$ inch long, bent at right angles to the straight stem, and bevelled to a cutting edge. A quarter of an inch of the zonule is divided at the lower border of the lens, before a small iridectomy is made. If the manœuvre is successful, the lower edge of the lens is seen to tilt forward and to press against the iris. Afterwards, a firm lens can nearly always be delivered in its natural position, but a soft lens rotates on its horizontal axis, the lower edge coming forward and upward, and being delivered first.

Occasionally, the zonule is not divided at the first attempt, and in other cases the capsule may be cut instead of the ligament of the lens. No figures are given of vitreous losses. H. HERBERT.

(13) This article by **Eason**, of London, is written with the object of showing that no single operation can be adopted for all cases as a matter of routine. It seems to the reviewer to be a fair and unbiassed account of the advantages and disadvantages of the different operations in everyday use and of the Smith operation. There is one point only which appears to call for special comment, because it is probably controversial, namely, the question of artificial ripening. Smith says that trituration, or iridectomy, with massage through the cornea, has no influence on the immature cataract if the massage be done with such a degree of pressure as will not dislocate the lens. Eason asserts that he himself is constantly triturating lenses, and that it is a matter of common experience that trituration of the lens through the cornea usually produces complete opacity of the lens in from three or four weeks. He has never dislocated the lens, and vitreous has never been lost at the subsequent extraction. Immature cataracts can also, says Eason, be extracted with safety after removal of the anterior lens capsule with forceps by the method of Treacher Collins. "It wants to be thoroughly understood, therefore, by all those who are suffering from immature cataract, that it is not necessary in these days to wait until a slowly growing cataract matures, whether an extraction of the capsule or an ordinary extraction is proposed. The sole criterion is the amount of vision and its importance to the patient. Directly vision has failed in both eyes, so that the patient cannot read or write with comfort, an extraction can be undertaken with safety." The reviewer contents himself with the remark that the statement quoted above is assuredly a bold one to make, considering the avidity with which it may be read in the *Lancet* by patients with immature cataract. ERNEST THOMSON.

(14) **Dutoit**, of Lausanne, after a detailed consideration of the mechanism of the cataract section, recommends a knife which is rather different from the ordinary Graefe knife. It is 4 mm. broad, and in consequence can be made considerably thinner than the orthodox pattern. The point is made like a Beer's knife. The thickened back of Graefe's knife, which Dutoit considers to be mainly responsible for the deformity which ensues during the section, is absent from this knife. The eye is fixed in the upper quadrant somewhat on the nasal side of the vertical meridian, and 2 mm. outside the limbus, in the manner described by Angelucci. Generally, Dutoit completes the section by a single insertion and withdrawal of the knife.

The author claims that his knife eliminates the sawing movements necessary with Graefe's knife, but we find that the two-stroke section is often perfectly feasible with the orthodox Graefe knife. Dutoit's knife would, however, appear to be a very practical instrument, and possibly might have advantages over Graefe's, more especially because it is thinner. The author has investigated the nature of various sections by staining them with fluorescein.

The communication is well illustrated, but is much longer than would seem necessary. T. HARRISON BUTLER.

(15) **Keiper**, of Lafayette, discusses the extraction of cataract from the eyes of those who have attained the age of ninety years and upwards. He recounts the history of one patient of ninety-three years, with bilateral cataract, in whom simple extraction was carried out on one eye, only to be followed three days later by violent panophthalmitis. The affected eye was promptly enucleated, but three days afterwards, a fire occurred in the hospital, and the man tore off his bandages and sought escape from the burning building.

He then took to his bed, gradually sank, and died. In a second case, which occurred in a female, aged one hundred years, the combined operation on one eye was followed by V. (corrected) of 20/50 and No. 3 Jaeger.

Keiper has collected from colleagues in the United States sixty cases of the removal of cataract in persons of ninety years and upwards, and of that number seven patients were over one hundred years of age. He concludes that if a very aged person is in good physical and mental health, the operation of cataract should not be refused if all is favourable for a successful result. Precautions before operation should be multiplied, and a preliminary iridectomy is advisable. It appears that the wounds in persons of this class heal even better than in younger subjects. SYDNEY STEPHENSON.

(16) **Webster Fox,** of Philadelphia, gives a translation of an article by van Lint which appeared in *La Clinique Ophtalmologique*, T. III, No. 7, and appends an account of his experience with van Lint's operation, of which he speaks very favourably. The procedure is simple.—The conjunctiva is incised round the upper half of the cornea and then undermined upwards for about ten millimetres. At each side a suture is inserted in the conjunctival flap, one end being passed through near the extremity of the pericorneal incision, the other about ten millimetres further up. A simple extraction is done through a superior section in the usual way, and the sutures are then tied. This draws the undermined conjunctiva down, so that it lies across the upper quarter of the cornea, keeping the lips of the wound in contact, preventing prolapse of the iris, and guarding the wound against infection. The indications for this operation are found where there is special risk of prolapse of the iris or of infection of the wound. A. J. BALLANTYNE.

(17) The first part of this paper by **Stanculeanu,** of Bucharest, describes his experiences in Smith's intracapsular extraction, which he has performed twenty times. He met with the usual complications during and after the operation, and concludes that, as a rule, good visual results can be obtained, not so good as Smith claims, but not so bad as some of his critics would have us believe.

Stanculeanu then describes his own method (introduced at the Heidelberg Congress in 1910), now modified by omitting the application of homatropine the previous evening and by adding an iridectomy. The essential feature of this operation is that a sickle-shaped pair of forceps, about the size of Graefe's iris forceps, is introduced into the anterior chamber after the section has been made, the convexity of the forceps is gently pressed against the lens, grasping a fold of the anterior capsule, and then, by side to side and up and down movements, the lens is freed from its attachment to the suspensory ligament. Expression of the lens is carried out by means of two spatulæ. In from 30 per cent. to 40 per cent. of the cases the manipulation opens the anterior capsule, and the operation is completed in the usual fashion; in the other 60 per cent. or 70 per cent. the lens is extracted in its capsule. The results of the operation here given are based on an experience of 240 cases. Loss of vitreous occurred twice. The complications after operation included hæmorrhage into the anterior chamber in 11 cases, delayed healing of wound in 5, panophthalmitis in 2, glaucoma in 1, infiltration of the lips of the wound in 2, irido-cyclitis with loss of vision in 1, vitreous opacity in 2, and upward displacement of the pupil in 3. The author claims that the results of his operation are very good. He says it is impossible by any method to guarantee that the lens will be extracted in its capsule. Smith's operation can give good results, but in many cases it is dangerous; Stanculeanu's operation is safe, and if the extraction in the capsule does not "come off," the operation can be completed along the usual lines. A. J. BALLANTYNE.

(18) **Ellett**, of Memphis, has adopted Kalt's method of suture of the cornea in twenty-four cases (twenty-two extractions of senile cataract and two cases of dislocated lens). Surgical results, upon the whole, extremely satisfactory. No infections: four prolapses. Visual results no better than with other methods. "The suture," remarks Ellett, "is surprisingly easy to insert. A farm hand probably could not place it, but to any one possessing the skill necessary for ophthalmic surgery, there is no difficulty."

SYDNEY STEPHENSON.

VII.—REMEDIES.

(EIGHTH NOTICE.)

(1) **Goldzieher, W.—The treatment of gonorrhœal conjunctivitis.** *Wien. klin. Wochenschrift*, No. 47, 1911, and *Brit. Med. Journal*, June 15th, 1912, No. 332, epitome.

(2) **Terrien.—Ocular tuberculosis and its treatment. (Tuberculose oculaire et son traitement.)** *Bulletin Générale de Thérapeutique*, 15 et 23 avril, 1912.

(3) **Terrien, F.—Paralysis of both external recti of diphtheritic origin. Treatment by serum-therapy. Cure. (Paralysie des deux droits externes d'origine diphtérique. Traitement par la séro-thérapie. Guérison.)** *Annales de Médecine et Chirurgie*, mai, 1903.

(4) **Charles, J. W.—Serpiginous ulcer—complete involvement of cornea—recovery under mixed vaccine and urotropin.** *American Journal of Ophthalmology*, May, 1912.

(5) **Fromaget, Camille.—Arsenobenzol unsuccessful in tabetic optic atrophy. (Insucces de l'arsénobenzol dans l'atrophie tabétique du nerf optique.)** *La Clinique Ophtalmologique*, 10 mai, 1912.

(6) **Smith, Henry.—The treatment of commencing senile cataract. (Le traitement de la cataracte sénile commencante.)** *La Clinique Ophtalmologique*, 10 mai, 1912.

(1) **W. Goldzieher** points out how unsatisfactory are the results of the customary treatment of severe acute gonorrhœal conjunctivitis. He has made trial in fifteen cases of a method of treatment which consists in applying moist heat locally. He bases this treatment upon two facts: the first is that the gonococcus is almost always found on the surface of the conjunctiva attacked, or in the superficial cells, and only exceptionally is found in very small numbers in the subepithelial tissue. The second is that the gonococcus bears higher temperatures badly, is destroyed in ten minutes at a temperature of 44°C. (111°F.) and immediately at 45°C. (113°F.) The author has therefore devised an instrument which is convenient and portable, and by which a spray of steam can be directed towards the conjunctivæ, from such a distance as to give a temperature of from about 45°C. to 52°C. (125° F.) at the conjunctival surface. At first, before using an instrument by which the stream could be regulated, the process was so painful that it was not adequately carried out. Even with the apparatus the first applications are painful, but later ones are found to give hardly any inconvenience. If the lid is too much swollen

to be everted ice is applied in the customary way until this becomes possible. When complete eversion is still not possible the steam is applied at the higher limits of temperature. If there is much chemosis the ocular conjunctivitis is also treated. The author has had the most satisfactory results from the treatment, which was only given in very severe cases. The fifteen cases treated were in two groups, according to whether the cornea was or was not already involved when treatment was begun. In the ten cases in which the cornea was untouched recovery was quick and complete. The lids promptly became less swollen, so that complete eversion became possible, chemosis lessened, and the discharge by about the fourth day had come down to a minimum The cornea in all cases remained free. In five cases there were already corneal defects when the treatment was begun. In one case with purulent inflammation of the cornea full recovery was obtained. In two in which there was almost complete infiltration a moderate degree of vision was saved with the help also of operative treatment. In the remaining two cases in which the cornea was already destroyed the applications did, at any rate, quickly cause cessation of the purulent secretion. An after-treatment of the conjunctiva may be needed if the secretion, although free from gonococci and non-purulent, still persists. After-treatment with silver nitrate solution is seldom needed. The author has no doubt of the immense value of the treatment as compared with the customary silver nitrate method.

(2) These two articles, by **Terrien**, of Paris, form a kind of summary or review of ocular tuberculosis, arranged apparently for general medical readers. ERNEST THOMSON.

(3) **F. Terrien** reports an interesting and rare case of post-diphtheritic paralysis. A child of five and a half years, six weeks before coming under observation by Terrien, had had an attack of diphtheria of medium intensity. This attack had disappeared rapidly under the influence of anti-diphtheritic serum. From the history it appeared that about five weeks later, there was paralysis of the soft palate, which was followed after a few days by a convergent squint. On examination, it was found that there was a not quite complete paralysis of both external recti, without involvement of ciliary muscle or sphincter pupillæ

It was decided to give a massive dose of serum, and the patient having been taken into hospital, 40 cubic centimetres of antidiphtheritic serum were injected under the skin of the abdomen on December 26th, 1911. There was no reaction and no immediate alteration in the eye condition. On the 27th and 28th the convergence persisted exactly as before, but on the 29th had entirely disappeared. The departure of the strabismus was as rapid as its onset. Two or three days later the nasal speech also disappeared —apparently more gradually—and the patient was dismissed cured.

The author then reviews the literature, and concludes, although he does not forget the natural tendency to cure without treatment, that in the present case the relation between serum injection and cure of the symptoms was too close to be explained easily by simple coincidence. ERNEST THOMSON.

(4) As **Charles**, of St. Louis, remarks regarding his case, " The one point of interest is that some time during the treatment the patient complained of pain on urination and the urotropin was stopped, when the cornea began again to become yellow and the aqueous to fill up with pus. Upon resumption of the urotropin the cornea resumed its clearing process."

ERNEST THOMSON.

(5) **Fromaget**, of Bordeaux, who is by no means an opponent of the use of Salvarsan in suitable eye cases, relates in full the case-history of a man of 30

years, who had contracted syphilis twelve years previously, had not treated it regularly, and who now began to suffer from tabes with progressive optic atrophy. It was realised by his advisors that the case was not suitable for Salvarsan, and the patient, who was completely obsessed with the miraculous value of the drug as lauded in the press, was advised against it. He persisted, however, and threatened suicide if something were not done. Under these circumstances Fromaget and Petges (who had also been consulted) consented to try Salvarsan. The point of chief interest in the result is that while the Salvarsan did absolutely no good, it equally did no harm. The authors give their opinion that this drug is only likely to be of service in tabetic atrophy when, one nerve being atrophic, the other nerve is absolutely sound. In such circumstances the affection of the second eye may be avoided; but the cases are rare. ERNEST THOMSON.

(6) The article by **Lieutenant-Colonel Smith,** of Amritzar, is the same in substance and all essential particulars as that published in the *Lancet*, April 20th, 1912, an abstract of which was published in THE OPHTHALMOSCOPE of July last (p. 420). ERNEST THOMSON.

VIII.—MISCELLANEOUS.

(1) **de Cerqueira.—A case of sudden unilateral amaurosis. (Un cas d'amaurose unilatérale subite.)** *Archives d'Ophtalmologie*, février, 1910.

(2) **Post, M. H.—Reports of several cases of neuropathic keratitis.** *American Journal of Ophthalmology*, April, 1910.

(3) **Boulai.—About three cases of traumatic neuritis.** *La Clinique Ophtalmologique*, 10 avril, 1910.

(4) **Contino.—On the development of multiple ciliary follicles.** *La Clin. Oculist.*, août, 1910.

(5) **Wirths, M.—A contribution to our knowledge of persistent pupillary membrane. (Beitrag zur Kenntnis der persistierender Pupillar Membran.)** *Zeitschrift für Augenheilkunde*, April, 1911.

(6) **Pickler A.—Rhythmical protrusion of both globes caused by the action of the fourth nerve after cerebral hæmorrhage. (Rhythmisches Vortreten bei der Augäpfel durch Trochleariswirkung—Nystagmus protractorius.)** *Zeitschrift für Augenheilkunde*, Juli, 1911.

(7) **Rund, F.—On a plasmocytoma of the conjunctiva. (Ueber ein Plasmozytom der Konjunktiva.)** *Zeitschrift für Augenheilkunde*, August, 1911.

(8) **Neisner, W.—A clinical contribution to the question of coloboma at the entrance of the optic nerve. (Ein klinischer Beitrag zur Frage der Colobome am Sehnerveneintritt.)** *Zeitschrift für Augenheilkunde*, August, 1911.

(1) In a robust woman of 40, with good antecedents, **de Cerqueira,** of Bahia, Brazil, records the occurrence of a sudden unilateral amaurosis in the left eye. The diagnosis was acute unilateral retro-bulbar neuritis, and the cause a

severe chill incurred whilst at sea. The right eye was normal in every respect. Under treatment by purgatives, calomel, leeches, and sweating, the vision returned in 4 days to 1/8 with restoration of about one-half the field. With the continuous current, strychnine, and potassium iodide, the vision improved in 24 days to 2/3. Complete cure in three months.

BERNARD CRIDLAND.

(2) **Post's** cases are interesting because every ophthalmic surgeon has now and again come across such more or less atypical keratitis, in which the corneal epithelium persistently breaks down, and in which "all the King's horses and and all the King's men" can hardly set it up again. In these cases Post assumes a disturbance of nutrition of the cornea. They were not infections nor did they depend on any specific disease. It is worthy of note that in most of the cases the patients were women who had at some period in the treatment a disturbance of the genital organs. One had "a very irritating inflammation of the vagina," which was diagnosed as of atrophic character, the other had metrorrhagia. It is needless to enumerate the various drugs, local and general, which were employed in the long courses of ocular treatment which were necessary before cure ultimately took place. Even the application of egg yolk, by the surgeon, and of Christian Science, by the patient, had their places. It is unnecessary, perhaps, to add that while the former was fairly efficacious, the latter was not so. ERNEST THOMSON.

(3) The object of **Boulai**, of Rennes, is to draw attention to the fact that there is a great resemblance between the lesions which may be produced by alcohol, infectious diseases, etc., and those produced by traumatic shock. Just as affections which determine, by hypertension, optic neuritis, the gravity of which may be considerable and the lesions definitive, so a simple traumatic shock, even though apparently insignificant, may lead to the same result.

The three cases had in common the following points :– the patients were adults, aged 37, 29, and 50 years respectively ; in each of them a violent shock (a jet of steam, a blow with a piece of coal, a shot from a gun) had, without causing any important external lesion, brought about sudden blindness with similar phenomena of "choked disc" type. The cases however differed in their final results. No. 1 had consecutive atrophy and blindness. No. 2 recovered completely in a few days. No. 3 recovered only partly. In all three a diagnosis of hysterical amaurosis was excluded by the ophthalmoscopic appearances. The ages were against a hypothesis of transitory pseudo optic neuritis of adolescents.

Thus, in the cases under consideration, the agent determining the alteration of pressure was shock. But in many other cases why should the determining agent not be alcohol or tobacco, themselves modifiers of arterial pressure. The author then relates a case in point in which extensive peripapillary œdema and reduction of vision followed an alcoholic bout ; and refers to the cases reported by Widal, Joltrain, and Weill (*See* THE OPHTHALMOSCOPE, 1910, p. 273), in which a typhoid patient suddenly became blind from bilateral papillary œdema.

These points are of great importance for the expert who is concerned with workmen's injuries, and require further investigation. ERNEST THOMSON.

(4) **Contino** records the results of his examination of a number of follicles of the eyelashes, which were double, or, in one case, triple. By reconstructing the follicles from serial sections, he comes to the conclusion that such follicles are not, as might be thought, the result of the partial fusion of two or more follicles during their development, but that the accessory follicle is derived from one of the accessory glands, which usually develop into the gland of Moll and of Zeiss, and have, in these particular instances, taken on a

different growth and become hair follicles. This conclusion is interesting, as it fits very well with the observation of Kuhnt, *viz.*, that congenital distichiasis is due to the maldevelopment of the Meibomian glands.

HAROLD GRIMSDALE.

(5) **Wirths,** of Königsberg, points out that the generally accepted view that a persistent pupillary membrane always springs from the anterior surface of the iris is incorrect. He brings forward evidence to show that it may arise from either the outer edge, the inner edge, or the central portion. T. HARRISON BUTLER.

(6) **Pickler** (Klagenfurt) describes a case in which after cerebral apoplexy both eyeballs showed a pulsatile movement which synchronised with the respiratory movements. With each inspiration the eyes were slightly protruded and depressed. This movement he calls *nystagmus protractorius.* Pickler made some experiments by tying a suture to the superior oblique muscle in the *cadaver*, and believes that the phenomenon is due to action of the trochlear muscle. A second case is also noted in which a similar phenomenon occurred. In the first case most extensive bleeding had taken place into the ventricles ; the second was not examined after death. Probably these cases are not isolated ones ; it might be worth while to look for it in cases of massive cerebral hæmorrhage. T. HARRISON BUTLER.

(7) **Rund** (Königsberg) describes the histology of a recurrent growth removed from the palpebral conjunctiva. Examination showed that the tumour was neither a sarcoma nor a granuloma, but consisted almost exclusively of plasma cells. The origin of these cells is fully discussed, and a drawing of a section is introduced. T. HARRISON BUTLER.

(8) **Neisner** (Königsberg).—Two very excellent coloured drawings clearly illustrate the condition present in two of the cases described. The nature and causes of the anomaly are fully discussed. T. HARRISON BUTLER.

BOOK NOTICES.

Contribution to the Critical Examination and Treatment of Squint. (Beitrag zur Beurteilung und Behandlung des konkomitierenden Schielens.) By GUSTAV CAESAR, in Marburg a. d. Lahn. Halle a. S. : Carl Marhold, Verlagsbuchhandlung. 1912. Price 1.50 Mark.

This pamphlet deals with concomitant strabismus. After reviewing the muscle theory of squint and Donder's refraction theory, Cæsar passes on to pay tribute to Worth for his monograph on squint, and to Bielschowsky for his work on motor anomalies, pointing out that they put in the fore-front of their work the conception of fusion.

Taking the various theories into consideration, he proceeds to analyse his material of the two last years from the Marburg *Universitäts-Augenklinik.* This comprises 164 cases, of which 147 are instances of convergent strabismus. Of these, fifty-one showed no astigmatism, forty-five being hypermetropic, and of the others both eyes emmetropic (2), both myopic (1), combination of these (3).

Of the ninety-six astigmatic cases, sixty-four showed astigmatism in both eyes with a monocular squint and five astigmatism in both eyes with an alternating squint. Hypermetropic astigmatism accompanied by monocular or alternating squint exceeds all other forms.

The proportion of isometropic to anisometropic eyes is 32 : 115 respectively. There remain seventeen cases of divergent strabismus, and nine of these do not show any astigmatism, five are myopic and two hypermetropic in both eyes.

Of the astigmatic cases, five showed compound myopic astigmatism and three compound hypermetropic astigmatism.

In analysing the fusion power, 138 cases were examined ; eighty-seven had no fusion power, thirty-four had grade one, twelve grades one and two, and five grades one to three and still strabismus. Of the last five cases, three were discounted for various good reasons, thus leaving two cases of strabismus with full fusion power. These are explained on the ground either that they are the result of a fully developed fusion power overcome by strong muscular excitation, or that there is a sufficient development of the fusion power to the normal expanse even to the second or third grade, but lacking in intensity.

Heterophoria in itself can only prevail in a few cases to give an intermittent or permanent squint, and in other cases it must be due to abnormal nervous impulses which are specially manifest where the body is mentally or physically tired.

If then the strabismus depends upon a lack of fusion power, we must look for a reason for this. Turning to the question of heredity, the author found it present in 35.1 per cent. (*cf.* Worth 50 per cent.).

In a number of cases specific infections played a part. In adult life also squint developed where, through a severe eye disease, the visual acuity fell to a minimum.

The course of treatment followed out is to correct, in the first place, all errors of refraction and follow them up in the cases where the age permits with a course of fusion practice. Failing this, then one or other of the various methods employed to increase the visual acuity of the squinting eye must be resorted to. The methods tried were :—(1) the use of atropine, (2) the binding up of an eye, and (3) the use of atropine with over-correction.

The best results were obtained in children under ten years. To obtain results the patients should be kept under close observation.

The children getting fusion exercises attended at the Clinic once a week and each practised for ten minutes. The instruments used were Worth's amblyoscope, Krusius' modification and more recently Bielschowsky's apparatus based on Pigeon's stereoscope. In cases where there was difficulty in getting the patient to recognise two images, the Krusius' apparatus was found useful. When this was established, Worth's instrument was again resorted to. The author found Krusius apparatus preferable to Bielschowsky's.

The practice lasted for six to seven weeks. Of thirty-two cases in which this method was carried out, sixteen gave good results, ten relatively good, and sixteen no result, while the angle of squint was 0° in ten, 5° in three, 15° in thirteen, and 15° in six. In twenty-four cases the result of the fusion exercises after about two years was—no change in seventeen, diminution in five, increase in two. The author found that between the fifth and tenth year of life is the best time to obtain a good proportion. The results were more easily obtained in the well-developed and intelligent children than in the poorly nourished and backward ones.

The portion of the paper dealing with the results of operation is so elaborately analysed that it is impossible to abstract it to any useful purpose.

Wm. Hislop Manson.

The treatment of Glaucoma under the control of the Schiötz Tonometer. (Aufgaben der Glaukombehandlung unter der Kontrolle des Schiötzschen Tonometers.) By E. VON HIPPEL. *Sammlung zwangloser Abhandlungen aus dem Gebiete der Augenheilkunde.* Bd. VIII, Heft vii, 1912.

The object of v. Hippel's *brochure* is to indicate how, with the tonometer of Schiötz now added to our equipment, we should look forward to solving, within the next few years, some of the many baffling problems of glaucoma. It is not too much to say that, in spite of the large amount of good work that has been done in this subject, our knowledge of the relative values of different forms of treatment is far from satisfactory. The author does not in this communication point out to what extent this is due to the want of a sound knowledge of the pathology of the condition or conditions referred to, but, assuming that elevated intraocular pressure is an essential feature of the disease, he proceeds to show what new possibilities are opened up to the investigator by the systematic use of Schiötz's tonometer. We start out, of course, from the results of measurement of the normal tension. This has been found to vary within fairly wide limits, even in one and the same individual, but it is generally believed that the upper limit of the normal lies about 27 mm. of mercury. One of the first questions that meet us, therefore, is, Are we justified in making a diagnosis of glaucoma, without further evidence, if an eye possesses a tension of more than 30 mm.? Although there are some who would answer this question quite decisively in the affirmative, there are many facts which show that such a position must be adopted with caution. Cases have been observed over years, in which the tension was persistently above this level, and yet vision, fields, fundi, etc., remained apparently normal. On the other hand, there is reason to believe that in some cases the cupping of the disc, the failure of vision, and the narrowing of the field of vision, may come on, or at least progress, while the tension is never outside of what are supposed to be the normal limits. In these doubtful cases help is sometimes obtained by taking other points into consideration. For example, glaucoma may be suspected if an eye has tension within the so-called normal limits but persistently above that of its fellow, or if both eyes have the same tension but are known to have had a lower tension at an earlier period, or if myotics produce a pronounced fall of tension.

v. Hippel devotes a good part of his pamphlet to a detailed consideration of his own material, dividing the cases into inflammatory glaucoma and glaucoma simplex. We need not follow him in his analysis of the cases, but may draw attention to some of his conclusions. He thinks it well to put off as little time as possible with the use of myotics in the acute cases. Every eye in which the tension cannot be reduced to normal or near it in a few hours should be iridectomised, even if it be the only eye, unless the other is known to have been damaged by operation performed under similar circumstances. In simple glaucoma with contracted field, if myotics bring the tension to normal, operation should be avoided ; but if tension cannot be lowered by myotics, the case should be considered on its merits, taking into account the probable duration of the patient's life, the condition of the second eye, and other factors. On the whole, his experience teaches him that in glaucoma simplex with field defects, operation can only, at the best, retard the inevitable progress of the disease. Discussing his cases from the point of view of the operation employed (iridectomy, sclerotomy, sclerectomy, cyclodialysis), he confesses that he cannot draw any useful conclusions from his series of glaucoma simplex cases.

Perhaps the most important suggestion conveyed by v. Hippel's communication is that we have a large amount of the most useful material for investigation lying to our hands in the apparently healthy "other eyes" of glaucoma patients. He advocates the systematic tonometric examination of these eyes, to extend over a period of years, with a view to the discovery of glaucoma in its very earliest stages. It is sufficiently established by his own cases that a rise of tension can thus be detected at a time long before any defect is suspected either subjectively or objectively. It is evident that the detection of high tension at the very earliest date, before functional loss has begun, will give an opportunity, usually denied us, of testing the respective merits of various forms of treatment. It should be noted that isolated observations of the ocular tension are of relatively little value. The author advises that cases under observation should be taken into hospital once in six months or so, for a period of a week, and a series of measurements made at different times of the day, and under different conditions. He is confident that if this matter is taken up in a thorough manner, we shall know in ten or fifteen years whether glaucoma in its early stages is curable or not.

Whether he is justified in his optimism or not, it is to be hoped that all who are engaged in the investigation of glaucoma will act on his advice. One cannot but agree with him in his opinion that the tonometer is now an indispensable part of our equipment, and that no one need expect his work to receive the fullest consideration who does not systematically employ it.

A. J. BALLANTYNE.

THE OPHTHALMOSCOPE DIARY.

1912.

Scottish Ophthalmological Club.	Nov. 1st (5.30 p.m.)	Ophthalmic Institution, Glasgow.
Section of Ophthalmology, *Royal Society of Medicine.*	Nov. 6th (8.30 p.m,)	1, Wimpole Street, London,
Midland Ophthalmological Society.	Dec. 3rd (4.30 p.m.)	Eye Infirmary, Nottingham
Section of Ophthalmology, *Royal Society of Medicine.*	Dec. 4th (8.30 p.m.)	1, Wimpole Street, London,

1913.

Midland Ophthalmological Society.	Feby. 4th (5.30 p.m.)	Birmingham and Midland Eye Hospital
Section of Ophthalmology, *Royal Society of Medicine.*	Feby. 5th (8.30 p.m.)	1, Wimpole Street, London.
Section of Ophthalmology, *Royal Society of Medicine.*	March 5th (8.30 p.m.)	1, Wimpole Street, London.

1913—continued.

Midland Ophthalmological Society.	April 1st (5.30 p.m.)	Birmingham and Midland Eye Hospital.
Ophthalmological Society of the United Kingdom.	April 24th and 26th	London.
French Ophthalmological Society.	May	Paris.
Section of Ophthalmology, *Royal Society of Medicine.*	May 7th 8.30 p.m.	1, Wimpole Street, London.
Midland Ophthalmological Society.	June 3rd 4.30 p.m.	Shrewsbury.
Section of Ophthalmology, *Royal Society of Medicine.*	June 4th 8.30 p.m.	1, Wimpole Street, London.
Oxford Ophthalmological Congress.	July	Keble College, Oxford.
Section of Ophthalmology, *British Medical Association.*	July	Brighton.
Ophthalmologische Gesellschaft.	August	Heidelberg.
Section of Ophthalmology, *XVIIth Int. Congress of Medicine.*	August 7th to 12th	London

NOTES AND ECHOES.

Deaths.

WE regret to announce the following deaths.

Dr. Julius Siklóssy, senior *privat-dozent* of ophthalmology in the University of Clausenburg, at the early age of 44 years.

Dr. G. H. Cocks, secretary of the New York Ophthalmological Society, aged 51 years. Dr. Cocks was for many years a member of the staff of the New York Eye and Ear Infirmary.

Dr. Abraham B. Williams, late of St. Louis, aged 77 years.

Dr. James B. Spencer, of Wellston, Ohio, aged 54 years.

Dr. J. S. Trontman, of Paducah, Ky., succumbed to cerebral hæmorrhage in the Western State Hospital at Hopkinsville.

* * * *

The Industrial Diseases Committee.

THE Industrial Diseases Committee are considering whether the Workmen's Compensation Act (1906) should be extended, among other diseases, to clonic spasm of the eyelids, apart from nystagmus. Those who desire to give evidence for or against should communicate with the Secretary of the Committee, Mr. Arthur Lock, the Home Office, London.

* * * *

Appointments. DR. CARL VON HESS, professor of ophthalmology in Würzburg, has been appointed to the chair at Munich in succession to the late Professor Eversbusch.

Dr. A. Bielschowsky has been appointed to the chair of ophthalmology in the University of Marburg, in succession to the late Dr. Bach.

Dr. R. Granville Waddy, D.O., Oxon., has been appointed Inspector of Ophthalmic Hospitals in the Egyptian Medical Service. Dr. Waddy will act under Mr. Arthur MacCallan, chief inspector.

Mr. Douglas Rodger has been appointed whole-time ophthalmic inspector of schools to the Queensland Government.

Dr. J. G. de Kock, late house surgeon and registrar to the Royal Eye Hospital, London, has been appointed extra honorary ophthalmic surgeon to the Johannesburg Hospital, an institution that now contains upwards of five hundred beds.

Mr. E. C. Green has been appointed medical referee under the Workmen's Compensation Act, 1906, for County Court Circuit No. 5 with a view to his being employed in ophthalmic cases arising in the circuit

Mr. H. V. McKenzie has been appointed ophthalmic surgeon to the Newton Abbot Hospital.

Dr. William Sweet has been appointed to the chair of ophthalmology in the Jefferson Medical College, Philadelphia, Pa.

Dr. W. E. Bruner has been appointed adjunct professor of ophthalmology at Cleveland (Western Reserve University Medical College).

Dr. J. R. Nichold has been appointed oculist to the Austin (Tex.) Confederation.

THE following appointments as *privat-dozenten* are announced:—Dr. W. Meisner in Berlin; Dr. L. Marongiu in Cagliari; Dr. O. Meyer in Jena; and Dr. A. Maurizi in Rome.

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Dr. R. A. Reeves. Dr. R. A. REEVES, of Toronto, has been elected president of the Toronto Academy of Medicine.

* * * *

American Ophthalmological Society. THE following have been appointed office bearers in the American Ophthalmological Society, which will hold its next meeting (1913) at Washington, D.C. President: Dr. Myles Standish, of Boston; Vice-President: Dr. R. A Reeves, of Toronto; Secretary and Treasurer: Dr. William M. Sweet, of Philadelphia.

* * * *

Distinction. THE title of professor nas been bestowed upon Dr. W. Lohman, *privat-dozent* of ophthalmology in Munich.

* * * *

Sic transit.

THE Ophthalmological Society of the United Kingdom, as we knew it, is no more. The old Society (dear to the hearts of so many of us) was interred decently at a special general meeting, held in London, on October 17th last. On that occasion, the Council's recommendations, very different from those proposed but a few short months ago, were carried. Briefly, it was proposed that an annual congress be substituted for the monthly meetings; that the yearly subscription be reduced; and, finally, that negociations be entered into in respect of the disposal of the library and effects. The first point was approved by the Meeting, but the others were referred to a Committee for further consideration and report. We can only express the fervent hope that the career of the Society under its new conditions of existence will be as distinguished as those under the old *régime*. But there will be a difference.

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The Royal Society of Medicine.

SOME little misapprehension appears to have arisen as to the terms on which members of the Ophthalmological Society can join the Royal Society of Medicine. By special favour the entrance fee of two guineas chargeable to ordinary candidates for Fellowship is remitted in the case of members of the Ophthalmological Society who wish to become Fellows of the Royal Society of Medicine. They can obtain all the privileges of the Royal Society, including, of course, the library, on payment of an annual subscription of three guineas. That inclusive amount also enables them to join the ophthalmological section without further dues. On the other hand, if a member of the Ophthalmological Society desires to join the Section of Ophthalmology of the Royal Society of Medicine, he must pay first an entrance fee of two guineas, and thereafter an annual subscription of one guinea. To claim the privileges of the library will cost him an additional two guineas. It is clear, therefore, that his most economical plan will be to become a Fellow of the Royal Society of Medicine at a yearly charge of three guineas.

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THE

OPHTHALMOSCOPE.

A MONTHLY REVIEW OF CURRENT OPHTHALMOLOGY.

VOL. X.—No. 12.] *DECEMBER 1, 1912.* [TWO SHILLINGS.

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ORIGINAL COMMUNICATIONS.

MINERS' NYSTAGMUS.*

BY

T. HARRISON BUTLER, M.D., OXON.,

LEAMINGTON SPA, ENGLAND.

IN introducing the subject of miners' nystagmus to this Congress it is not my intention to describe in detail all the symptoms of the malady, nor to recount its history and the many theories which have been advanced to explain it. I desire to focus attention upon certain questions which are still open to dispute, in the hope that some of them may be answered, or that our discussion may render them less obscure.

The first question is, **Are we correct in speaking of "miners' nystagmus?" Is not the disease peculiar to the coal miner?** and **Is nystagmus an essential symptom?** If the disease is purely a colliers' malady, and if it may exist without nystagmus, I suggest that we adopt a term I owe to Mr. J. Jameson Evans, of Birmingham—**"Coal Miners' Neurosis."** I believe that you will all agree that the disease is solely confined to the coal mine, and that it is not found in metal mines or in any other trade. The late Mr Simeon Snell attempted to prove that an occupation nystagmus was to be found among certain compositors and others who worked in a cramped position and had to look upwards at their work. He cited 22 cases in all, and used them to support the theory that the disease was due to spasm of the elevators. It is therefore essential to examine them critically. The first case was in a compositor. He was well on leaving his office, but when he woke next day he found that "his eyes were all of a dazzling sensation," and objects seemed to be moving up and down. On examination, nystagmus was found to be present, the oscillations being vertical, and of a peculiar jumping up-and-down character, with some twitching of the eyelids. The nystagmus disappeared after rest, and he returned to work after two months. The manuscript was placed at a high level, and he had to look up to read it. This same youth had suffered from compositor's cramp; his health was bad; and he was liable to vertigo and faintness. This is a clinical picture dissimilar from that of miners' nystagmus. The nystagmoid movements—for apparently no true nystagmus was present—developed after a few months' work; miner's nystagmus takes on an average 19 years to develop. The movements in this case were absent after a night's rest, whereas the miner is at his worst when he starts his work. Again the oscillations rapidly disappeared after a few weeks' rest, but miner's nystagmus takes a much longer period of rest, a period often running into months and even years. The movements described by Snell were not the rhythmic oscillations of the miners' eyes, but spasmodic and jumping. It seems obvious that we have before us two totally different conditions. In Snell's compositor there were nystagmoid jerkings of the eyes in a weakly neurasthenic youth who had already had cramp of the fingers. All the cases adduced by Snell are of a similar nature, only two of them appear to have had true miners' nystagmus and one was a man *who worked in a coal mine* attending the cage. The other worked in a rolling mill, where he had no cramped work.

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* The opening address in a discussion on Miners' Nystagmus at the Oxford Ophthalmological Congress, July 19th, 1912.

In my opinion, Snell's collection of cases is not convincing, and up to the present, no similar observations have been made. Instances of nystagmus could be found among the workers at almost any trade, but nystagmus even when present only in extreme positions of the eye, is not necessarily identical with miners' nystagmus. We get the same condition in disseminated sclerosis.

I submit, therefore, that the Congress should decide that "*miners' nystagmus is confined to the collier.*"

The second question is a more open one.—**Can the disease be present without nystagmus?**

I believe that nystagmus is not essential to the diagnosis of the disease, and in confirmation of this view I will shortly describe three cases in which it was absent:

No. 1668†.—(Brandist) Age 29 years. Has had two accidents in the mine, complains of severe dazzling by the lamp, in the mine, which jumps up and down. Examination reveals no trace of any nystagmus, not even in a dark room and after rotation. This patient has severe photophobia and hemeralopia. His lids twitched all the time he was with me, and the twitching was worse when he looked fixedly at any object. V.R. = 6/24. V.L. = 6/18. There was too much photophobia for ophthalmoscopic examination.

No. 1190†.—(Fitter), age 38. Lights have been dancing for twelve months. Hemeralopia very marked.

No nystagmus can be detected. The lids twitch and the head nods from side to side. The head only nods when he looks at a light, and ceases when he turns away. The lid twitching is much worse when he looks up. V.R. = 6/60. V.L. = 6/36. Not improved. Both fundi are hyperæmic.

No 1482.†—(Potts), age 50. Has lost the right eye after an accident in the mine. The muscles of the neck twitch when he looks up and his eyelids blink rapidly. V. = 6/9. Lights dazzle and oscillate. The left field of vision is contracted. Complains of hemeralopia, but when examined, no real night blindness was found. For a long time no nystagmus was present, but some months later very slight movements of the eyes were detected.

Two of these men, then, had no nystagmus whatever, the third for a long time was without any nystagmus, but eventually a slight trace of it was discovered both by myself and by Mr. Bernard Cridland, who examined the case as medical referee. It will, however, be noted that all three men complained of the lights dancing. This might be the effect of the rapid twitching of the lids, or they might have nystagmus in the mine. I was quite unable to elicit a trace of it myself.

Whether or not this Congress decides that the coal miners' neurosis may exist without nystagmus, I feel that we ought to accentuate the fact that muscular twitching and tremor is an essential symptom in many cases. I have seen lid twitching, trembling of the muscles at the back of the head, and trembling of the hands. I have already mentioned head nodding as present in a non-nystagmic case. Perhaps the most curious instance of muscular movement was in a man aged thirty-seven, who had severe elliptical nystagmus (a combination of circular and lateral), hemeralopia, and vertigo. When he held his hand nine inches away from his face it moved round in a circular manner just as the eyes did. His vision was L. 6/60, but 6/24 with his head thrown back.

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†These patients were demonstrated before the Congress.

Is Hemeralopia a Symptom of the Disease?

On this apparently simple question there seems to be the very widest divergence of opinion. Nuel, Court, and Dransart, include it as a symptom, Court finding it present 127 times in 164 cases, Dransart in 5 per cent. of his cases. Romiée says that among several thousand cases he has never found one example of hemeralopia. Mr. Murray has recently expressed the same views. I have found hemeralopia complained of in 60 per cent. of my cases, a figure midway between Court's and Dransart's. But the matter is not so simple as it appears. The most careful questioning has convinced me that these men in the open country away from artificial lights have a real hemeralopia. Some of them complain that "a sort of mist rises before their eyes" and they run into things. This is quite apart from the fact that any point of light dazzles them at night. Many miners tell me that they lose their way in the open country in a degree of diffused light which was once amply sufficient for them. And yet when I take the same man and examine him in my darkened room I find that he can pick up objects in the dim light as well as I can. In this connection I would mention a patient of mine who has retinal changes, akin to retinitis punctata albescens, who becomes night blind at lighting-up time and remains so for a couple of hours or more. He, too, describes how a sort of mist rises from the ground. He has suffered from childhood, and has always had to arrange his life accordingly.

I feel, then, that these men have a real night blindness, even if it be not exactly of the same type as that familiar to us in cases of retinal torpor, such as retinitis pigmentosa.

Is there always an Error of Refraction?

My answer would be, Certainly not. I find that only 45 per cent. of my cases have an error of refraction, and this includes many examples where the error is only about +1.0D. In other words, the incidence of errors of refraction among nystagmic miners is about the same as it is among normal miners.

In most of the acute cases it is very difficult to examine the refraction, on account of the rapid nystagmus and photophobia.

May a case of miner's nystagmus which has recovered after rest from work in a mine, ever return to the pit?

I have seen it stated that after a reasonable period of rest, the miner who has lost all his symptoms may return to his work again. I believe that this view is incorrect. Two of my cases have returned to me with very severe relapses, the relapses being more severe than the original attack. This is a point upon which the Congress might well be asked to express a definite opinion.

What is the cause of miners' nystagmus?

For many years the myopathic theory, the view that the disease was due to cramp of the elevators of the eye, held the field, and was accepted unquestioned by all the text-books. This theory was championed by Snell in England, by Dransart in France, and by Nieden in Germany. At the present time the theory that miners' nystagmus is caused by defective illumination appears to be the favourite explanation. It has been suggested by Romiée that nystagmus is due to excessive accommodation, and Peters ascribes it to afferent impulses from the semi-circular canals caused by the position in which the miner works. The inhalation of gas from coal has been held responsible; and, lastly, nystagmus has been considered to be a central disorder of co-ordination.

It may be at once stated that neither the myopathic nor the darkness theory taken alone can account for all the facts, and therefore neither alone can explain the disease.

There are many considerations which tell against the muscle cramp theory.—The malady is confined to coal mines. It is quite unknown in other mines where men work in cramped positions. It is present in mines where the seams are thick and where men can stand to their work. The symptoms, although more frequent among "holers," are not confined to them. I have seen cases in men who only wheel trucks of coal and have never been coal getters. The disease has never been described among men who decorate ceilings nor in boiler menders. These latter work in a poor light and in cramped positions. Can the cramp theory explain the trembling of the hands, the rhythmic movements of the hands, the head nodding, or even the lid twitching? I think not. Can it explain Roger's case of a man who had nystagmus when he looked down and not when he looked up? The nystagmus is more frequently horizontal or circular than vertical, a fact difficult to explain by this theory. There are other objections of a physiological nature, but it is unnecessary to discuss them here. This hypothesis alone, will not account then, for all the facts, and so cramp cannot be the sole cause of the disease. Personally, I greatly question whether it is even a secondary factor.

It is impossible to dismiss the feeble illumination theory in such a summary fashion. Indeed, all the facts point to bad light as a very important factor. But it is by no means the sole one. Miners' nystagmus is peculiar to the miner; feeble illumination is not. Photographic plate makers work in total darkness; they do not develop nystagmus. But the evidence that feeble illumination is largely concerned with the disease is very cogent. Nystagmus is rare in candle mines. I have had only a single case from the candle mine in my district, and others have a similiar experience. Thus, Thomas, of Brynmawr, with 17 years' experience of colliery practice, states that nystagmus was practically absent among his naked light men. Court tells a similiar tale regarding the Durham mines. The ordinary tallow candle gives about ·80 per cent. of a standard candle-power; a clean safety lamp only 0·44, and when dirty, much less light. The incidence of the disease has been greatly reduced in Germany by the introduction of a better lamp, the Wolf-Benzine lamp with a candle power of 0·87. The disease first began to be described when the use of the safety lamp was enforced by law, and all miners ascribe the disease to bad light. Nystagmus is often directly incited by darkness, and this must support the view that feeble light is a factor in its causation.

I have not the remotest doubt that bad light is a contributory cause of a nystagmus, but it cannot be the sole cause. The real cause of a disease which is peculiar to coal mines must be a cause or a combination of causes which exist only in a coal mine. Light combined with cramp can be excluded, because we have cases which have done no holing, and have therefore no cause for cramp. The black walls with a crystalline fracture may have some influence in abolishing co-ordination, but how can this circumstance cause twitching of neck muscles and of the lids?

The inhalation of coal gas has been suggested as a cause and very summarily dismissed (by myself among other), but it is not by any means inconceivable that the effect of hydrocarbons in small doses long continued may not be without effect upon the co-ordinating centres of the brain. We have mercurial and arsenical tremors, why not hydrocarbon? Candle mines are free from gas, and from nystagmus! One of the worst cases I had ever seen had been working in an atmosphere so "gassy" that a lamp would not burn, and he had to use an electric lamp. I think we should at least keep the factor in mind as a possible contributory cause. It cannot be the sole cause, because nystagmus arrived with the safety lamp.

I am quite unable to form any opinion as to the exact cause of the disease. I believe it to be a central cerebral disease, like the nystagmus of insular sclerosis. It is characterised by twitching and rhythmic movements of various groups of muscles, the ocular muscles being chiefly involved. The hemeralopia is still a puzzle and requires elucidation.

The affected men always appear to me to be highly strung and of nervous types, but this is only a personal opinion. The disorder of co-ordination is caused by a condition which is peculiar to the colliery. Lack of light is an almost certain factor, inhalation of poisonous gases may be a factor, and there are probably other factors which have so far escaped our notice.

MINERS' NYSTAGMUS:

A Retrospect.*

BY

JOSIAH COURT, M.R.C.S.,
STAVELEY, DERBYSHIRE, ENGLAND.

IN 1890, Mr. Stokes, the Government Inspector for the Midlands, stated in his Report that the complaints of the coal miners that the safety lamp affected their eyesight was "one of sentiment rather than of fact," and he went on to say "that he trusted that the advocates of the injured eyesight theory would give equal publicity to the facts upon which they base their opinion."

There was a controversy in the Press, and the miners' leaders asked me if I could throw some light upon the question.

When I began practice in Staveley in 1865, there were five large collieries in the parish employing about 2,000 men and some of the pits were worked with "candles." I had, therefore, had twenty-five years' experience of the injuries and diseases of the eyes of the miners, and I certainly found that the cases of nystagmus were more numerous than in 1865. I knew Mr. Simeon Snell very well, and often sent him ophthalmic cases for consultation, as he was the chief authority on nystagmus. I quite believed at that time that his theory of the cause of the disease was the correct one. When I told him of my intention to make an examination of a large number of men working with lamps and naked lights, he was very pleased, and remarked, "that he was sure my reports would confirm his opinions as to the origin of the disease."

He asked me to go to Sheffield and meet several eye surgeons, and in his consulting room he had a collier lying down in the position of a "holer." This man had his eyes turned obliquely up to look at the roof, instead of looking at the place he was striking with his pick. I protested against the position. It was ridiculous for a man lying down on his side to cut coal and look away from what he was doing. Snell was angry and protested he was right, although at that time he had not been down a pit to see for himself. This picture of the man in Snell's study was transferred to his work on nystagmus, where it is to this day, and, in my opinion, that is the foundation for the "position" and myopathic theory, which is held so strongly and without sufficient evidence to-day. Well might "Romiée" say that this picture was "faked" or "arranged."

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*A contribution to the discussion on Miners' Nystagmus at the Oxford Ophthalmological Congress, July 19th, 1912.

As you are still aware, I made a report in 1891 of my examinations in Derbyshire, and when the result was known, that the men working with naked lights had no disease, Snell was furious with me and denounced me in the Sheffield paper as being a "miner's man," and alleged that the cases had been selected. I answered him by descending two Staveley pits and examining all the men, numbering 735, and I found the coal-getters had nystagmus to the extent of 34½ per cent. Again, in order to show the folly of his "oblique position picture," I took a photographer down Markham Colliery and photographs by flashlight were taken of a man lying underneath the coal, "holing" or "undercutting" the coal. This picture proves that a man always looks, when on his side, at the point he is striking. Besides, a man moves his head as well as his eyes whilst using his pick. Afterwards, I went down two collieries in the County of Durham—one with candles and the other with lamps, and the results were the same. Then, I spent nearly a week in the Forest of Dean where there was no disease. . . . Candles being used everywhere, seams very thin, and position of men at work very cramped. It was wonderful to see the miners coming out of the colliery. The day was bright and hot, and as I stood on the pit bank, I noticed that every man could look at the sunshine without trouble, a striking contrast to the men with nystagmus from the Derbyshire lamp pits, who are obliged to look away and turn their eyes down from the light when they come out.

The controversy still went on, and in order to extend the area of my investigations, I went to Liége to see the miners at work in Belgium. Dr. Romiée showed me statistics and details of his work, and he obtained permission for me to go down one colliery at Seraing, and another in the "Mons" district near Charleroi. The men and women worked eleven hours, lamps being used as in England. None of the men worked on their sides, and no holing was done, although the seams were thin. A square yard of coal face was marked out by the deputies, which a man cut out in small coal; the price was 1/4 per yard, which contained about one-and-a-half tons. He was a good man who could get two yards, or three tons, which comes to 2/6 or 3/- per day. There seemed to be no energy in the men—only 600 tons were raised by 800 men and boys; depth of shaft 680 metres. Temperature very high.

After this came the meeting of the British Medical Association at Nottingham, in July, 1892, and the discussion on nystagmus.

In spite of my investigations, undertaken entirely at my own expenditure of time and money, the whole of the eye specialists were led by Snell, and adopted his theories, with the notable exception of the late Tatham Thompson, of Cardiff, who was personally unknown to me, but who generously came forward and attended the meeting at Nottingham. I shall always hold the kindliest feelings of gratitude for his assistance in the fight. Like myself, he was converted from Snell's theory by the overwhelming facts observed in examining hundreds of miners in South Wales. He showed a diagram where men were working in a 7-foot seam with safety lamps, and never did any "holing," or lie down on their sides, and yet nystagmus was very prevalent n contrast to its absence in "Candle" pits, where men worked in thin seams, and did "holing" in cramped positions.

I remember well that, after leaving the meeting, Snell was so cross with us that he would not ride back in the same carriage on the Midland railway.

One of the worst features of the investigations was that the Government Inspectors of Mines believed that my theories, to a certain extent, made it difficult for them to change the illumination from naked lights to lamps in collieries where gas had been found in dangerous quantities.

Again, the coal owners were naturally dead against me, because if Snell's theory of the cause of nystagmus was right, that it was the position of the men at work which was the origin of the trouble, the light was of no consequence, and they would not be at the extra expense of using lamps with better illumination; especially as I had advised electricians to make a lamp, which, after all, was bound to be costly.

Now what would be the advantages of an improved light?

1st. Nystagmus would disappear.

2nd. There would be fewer accidents from falls of the roof or sides of the mine, because with a better light the men could see any defects.

3rd. Miners could do more work, get more coal per shift, and with much more comfort.

4th. Coal could be cleaned and dirt picked out better.

This was shown in a practical way by the result of an arbitration case held at Nottingham. The miners claimed an allowance for increased difficulties in getting coal, and from injury to their eyes when the collieries were put under safety lamps after naked lights had been in use. To some extent, owing to my evidence of the examinations of large numbers of men using both kinds of illumination, Judge Smyly awarded the colliers one penny per ton of coal gotten, a decision which holds good to this day.

Time went on, and still being in active practice amongst the coal miners, I was appointed a Certifying Factory Surgeon and, later on, a Medical Referee for Derbyshire under the Compensation Act.

When nystagmus was scheduled in the list of industrial diseases on the advice of the Departmental Committee, no witnesses, as far as I am aware, were called who held opinions different from those of Mr. Snell as to the cause of the disease. The Committee adopted his theory *in toto*. Consequently, the Report, in my opinion, was much biassed in favour of the "position" and "myopathic" origin of the complaint.

During October, 1911, I discussed the question of the increasing number of cases of nystagmus with Sir Arthur Markham, who has a very large interest in different collieries, and he asked me to write him a letter setting forth my views upon the different problems connected with the disease.

In order, therefore, to settle the various points, I advised that a Government inquiry should be undertaken into the conditions of the eyesight of all men and boys working in collieries and other mines in Great Britain where both safety lamps and naked lights were used. I suggested the following questions:—

1st. The true cause or causes of coal miner's nystagmus.

2nd. The duration and best means of cure.

3rd. If there is a constitutional liability.

4th. Whether one attack of itself predisposes to another.

5th. If the mild cases are incapacitated from work underground, and to what extent.

6th. If miners' nystagmus causes the sufferer to be a danger to himself and other miners at work with him.

This letter was forwarded to the Home Secretary, who wrote to Sir Arthur Markham in April last saying that Dr. T. L. Llewellyn, who had been making independent investigations, confirmed my opinions of twenty years since as to the cause of nystagmus.

The increasing number of cases of nystagmus is considerable—there being 1,618 cases in 1910 as compared with 460 in 1908 claiming compensation In my opinion, the numbers will go on increasing unless there is better illumination, because every year shallow pits, where naked lights are used, will be worked out and the men will go to the deep collieries, which are nearly all "fiery" and safety lamps are necessary.

Another cause is the advice of ophthalmic experts that no matter how mild the case is the man should leave his work in the pit. Besides, on page 10 of the Departmental Committee Report, 1907, it states "For the patient, though he may not at the time be actually unable to continue his work, ought to discontinue it if he is not to get worse." Truly, a council of perfection which I am not quite able to agree with.

Question of Legal Bearing on this Advice.

This question which is No. 5 on my list ought to be carefully gone into, as it may put an intolerable burden of compensation on the coal mining industries.

Two other questions not included in my list are very important and ought to be enquired into.—1st, Dr. Thomas L. Llewellyn in his very able report, which I naturally hailed with much joy on its appearance, says that "no man with error of refraction should work underground" as he believes that these cases are very prone to set up the disease. This, of course, is a serious matter, but I think Dr. Llewellyn will agree with me that more extended inquiry is necessary. 2nd, Mr. Snell in the year 1908, read a very able paper at the British Medical Meeting in Sheffield and he gave the results of his experiments upon forty-eight men suffering from nystagmus, and he came to the conclusion that they were not able the detect the "cap" formed by explosive gas on the light of a safety lamp. This, if true, would show that a miner with nystagmus is not only a danger to himself but to other fellow workmen.

In conclusion, there is one important question which I think should be brought to the notice of the Home Secretary. I am quite sure that there are hundreds of men earning full wages in the collieries who are affected with nystagmus to a much greater degree than many of those men drawing compensation money who are off work altogether or working on the pit bank.

In its directions to Certifying Factory Surgeons and Medical Referees the Compensation Act says that both officials must be satisfied that the claimant for compensation must be quite incapacitated from work at the time of giving up his employment . . . or the Courts will be asked to set aside the certificate. The advice of the Departmental Committee is that, however mild the case, the sufferer should leave off work, so that there is a serious legal difficulty to be decided.

COLOUR AND LIGHT IN RELATION TO MINERS' NYSTAGMUS*

BY

H. S. ELWORTHY, F.R.C.S.,

EBBW VALE, MON.

THE amount of nystagmus varies in different mines, and in order to ascertain why men, working in one mine, are more liable to get it than those in others, it is necessarry to examine the physical conditions of coal mines, and having done this, we can then consider whether these bear any direct relationship to the amount of nystagmus produced.

Let us consider *Light* and *Colour*.

Definitions.

(1) *Light* is the stimulus produced by radiation which excites vision, which is proportional to the rate of flow of radiant energy, and to a stimulus co-efficient which depends chiefly on the spectral distribution of that energy.

(2) The presence of a flux of radiant energy which produces light (often called a flux of light, or luminous flux) is recognised by the illumination which it produces.

(3) *Colour* is that property of the stimulus which, to the eye, gives the radiation a distinctive character. *Colour* is produced by the power which materials have to radiate selectively the luminous flux which falls on them or the energy produced in them.

For the sake of brevity, the term "eye" is meant for the whole visual apparatus, "light" is used instead of luminous flux, and "colour" is used as if it were a quality of a surface instead of being a quality belonging to a stimulus in the eye. It must be remembered that apart from the eye, there is no such thing as *light* and no such thing as *colour*. These are merely sensations.

Bearing these definitions in mind, and using the terms "light" and "colour" in the sense indicated, I will now ask you to make.

A Hypothetical Experiment.

Imagine that you are in a cavern, the floor, walls, and roof of which are absolutely devoid of colour, and surfaces of such a nature that they reflect back no light—that they are covered with some substance like lamp-black, only much blacker.

Put a lighted candle above your head, so that the light may fall in every direction, but not into your eyes. What can you see?

Nothing but "dead black."

Double your illumination, have two candles—and you will still see "dead black." Then take a 20 candle Osram lamp instead of the candles, and you will see nothing more than "dead black."

Try a searchlight, train it on the wall opposite, and imagine a large black beetle, that has covered itself with the lamp-black-like substance—is crawling up the wall in front of you. You will not be able to see it.

It is impossible to distinguish one piece of "dead black" from another. It is evident that under such conditions—increasing the light does not assist vision, it is simply wasting light.

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*A contribution to the discussion on Miners' Nystagmus at the Oxford Ophthalmological Congress, *July 19th*, 1912.

Light, in the absence of all colour, and in the absence of all reflection from surfaces, is useless for vision.

Now, imagine that you are in a brilliantly coloured chamber--no matter how bright the colours may be—but that there is *No Light*. What can you see? Again—nothing but "dead black."

Colour, therefore, in the absence of light, is useless for vision.

Now imagine that you are back in the cavern again, which is devoid of colour but that the surfaces are crystalline, such as in coal or jet, that is to say, they have innumerable small reflecting surfaces, or "*Surface Brightness*." With one lighted candle above your head, you will be conscious of black surfaces with innumerable specks of glistening white light.

This is the light that is reflected back directly into your eyes without diffusion, and represents one element in the "surface brightness" of the wall, and it can be measured.

Double the brightness of your source, and you will get about double the amount of this surface brightness. Have four times the light and you get four times the brightness.

Let the beetle, now with a clean and glossy back—crawl up the wall again —you will be able to see a white spot of light moving, but you will not be able recognise that it is a beetle.

The conclusions to be drawn from this feat of imagination are :—

That *Light*, without colour or surface brightness, is useless for vision.

That *Colour*, without light, is useless.

That *Light*, without colour, but with *Surface Brightness* enables you to see a little.

This third condition is approximately what one finds in coal mines, but only approximately, for there is a small amount of colour in the walls of every mine, and it varies in different mines and in parts of a mine.

It seems to me that the thing of real importance is the amount of light that is reflected back from the surface into the collier's eyes, rather than the amount of light thrown on that surface.

We may now consider these three factors, *Light*, *Colour* and *Surface Brightness*.

Light and Colour.

Which is the more important, if either? Can a man see better if he has half the light and double the colour, or half the colour and double the light?

A number of experiments were made with the object of finding this out, and the results by different observers averaged.

Cards were coloured with a mixture of black and white, some having twice as much white as others, 6 per cent. and 12 per cent.

On some, black lines were ruled of the same thickness, on others discs of a colour 1 per cent. lighter and 1 per cent. darker were fixed.

The experiments consisted in finding the greatest distance at which the lines or discs could be recognised, first with two candles and half the colour, 6 per cent, and then with one candle and double the colour, 12 per cent.

With the discs, the observer does not know which is being shown him, but he has to recognise whether it is lighter or darker.

The result of the experiments was that in all where we began with two candles and half the colour, 6 per cent, the lines or discs could be seen at a greater distance with the following one candle and double the colour, 12 per cent., but on reversing the experiments and beginning with one candle and 12 per cent. cards, followed by two candles and 6 per cent., the discs could be seen decidedly further away, with double the light and half the colour, but then, the observers were becoming more expert, and I doubt whether we allowed enough time for the eyes to become used to the one candle before commencing. In each case, vision seemed to improve towards the end of the experiment. On the whole, there seems, if anything, a slight advantage with double the light and half the colour.

Light and Surface Brightness.

The light reflected back from the surface of coal is, as far as I can judge, proportional to the light thrown upon it.

A piece of coal, with one candle one foot away, gave a surface brightness of .02 foot candles, and with two candles .04.

In another experiment, with 1 candle it was .09 foot candles.
2 .25
3 ·35
4 ·53

The increase is not uniform, nor was the surface of the coal, and the light from each candle fell on it from a slightly different angle.

Another piece, examined on three of its surfaces gave an average of .08 foot candle. That is to say, for each candle you get less than a tenth of the light back.

Compare this with a standard white screen :—

With one candle, one foot away, the surface brightness is one foot candle and with two, it is two.

You get a whole foot candle reflected back.

Colour and Surface Brightness.

Colour is the property of the stimulus (produced by radiation) which gives that radiation a distinctive character, according to the wave length of it, and is produced by materials radiating selectively the luminous flux incident on them as long as the rays distributed be within the limits of the spectrum.

In coal mines we are concerned, practically, with black and white only. The surface brightness in this case consists chiefly of the light reflected back from the facets on the coal, and this, being of the nature of total reflection, gives rise to the sensation of white light.

We have seen that if we double the illumination, we get practically double the surface brightness.

But, in the case of pigmented surfaces, such as a mixture of black and white, if you double the amount of white, does this result in getting double the light reflected back into the eyes ?

Here the surface brightness is in the nature of diffused reflection.

The question is answered by placing a black disc, on which any percentage of white may be exposed—on a turntable in a uniform light, and measuring the surface brightness of it while it is being rapidly rotated.

It will be found that on doubling the amount of white, rather more than one-and-a-half times as much light is reflected back. You do not get double, as in the case of surface brightness of coal on doubling the light.

It is the same with pigmented cards.

Thus—although with double the colour, one is able to see just about as well with half the light—when the light is uniform, and with twice as much colour, the amount of light reflected back, as measured by a lumeter is less than double. Part is lost by diffusion.

This leads to the question : Which is the more powerful stimulus to vision, colour or light ? I have not sufficient knowledge to answer it.

The Measurement of Colour in Mines.

The colour, or absence of colour, which is concerned in the production of nystagmus is that which comes within the field of vision of the miner while at work.

For the most of his time his face is turned towards the coal seam, but every now and then he has to turn round to get his coal out of the way, and then he sees surroundings rather lighter in colour, such as slack, posts, etc.

In order to allow for this, the field of vision may be fixed from a spot one foot further back. Thus, if the average distance of his eyes is 2 ft 6 in. from the seam, the field of vision is fixed from a spot 3 ft. 6 in. from it.

A chalk mark is made on the centre of the coal, and fixed with the eye; then the upper limit of the field of vision is found, and marked on the roof, and then the lower limit on the floor. We can then imagine a vertical strip of surface from the upper limit to the lower.

The distance from the mark on the roof to the coal face is then measured, the thickness of any slack, above, below or between the coal, the thickness of the coal and the amount of floor visible.

The colour of each of these constitutents of the vertical strip is then measured by matching them with the colour tests by the aid of an electric torch. The colour tests are cards, coloured with a mixture of black and white in percentages of white, 2, 3 and 4 per cent. and so on, and each is protected from dust by glass.

The measurements of each of the constitutents, in feet, is multiplied by the percentage of white, giving the colour units. These, when added up and divided by the number of feet of surface visible give the colour relief, or the average percentage of white in such a strip. By this method one can make a fairly accurate comparison of the colour in different mines. In metalliferous mines, where the ore is vertical, the colour relief is measured horizontally.

Example of the Measurement of Colour Relief.

Distance of men's eyes from coal seam, 2 ft. 6 in. Fixed field of vision at 3 ft. 6 in.

	Feet.	Colour %.	Colour units.
Roof	1.25	2	2.50
Slack above coal	1.50	3	4.50
Coal	4.50	2.5	11.25
Slack between coal ...	.25	4	1.00
Slack below coal	—	—	—
Floor	2.50	3	7.50
	10·00		26.75

$$\text{Colour Relief} = \frac{26.75}{10} = \underline{2.67}$$

Now, we have the three physical factors concerned with vision in coal mines, light, surface brightness, and colour relief.

If nystagmus were due to deficient light alone, one would expect that the incidence of it would be inversely proportional to the amount of candle power, but it is not so.

In our mine at Abercarn, the candle power at the "face" was .4, and the per centage of nystagmus for the past three years .14, while at the Gwaun-Cae-Gurwen with exactly the same candle power, there has only recently been one case, the first in eighty years. I have reckoned the percentage of this mine on the arbitrary basis of there being one case in the past six years. It is .037.

Again, there was found twice as much light at Abercarn as at Cwm, but at Cwm there is six times as much nystagmus.

Then, in metalliferous mines, in the Higher Levant mine, the candle power is .88, and in the Dolcoath .92, not a great deal more light, but never any nystagmus. What we do find is a great deal more colour, and the third factor surface brightness naturally increases both with the candle power and the colour, and also when the lights are used close together—a very important point. The metalliferous miner has his lights close to where he has to look, while the collier has them at variable distances, sometimes 16 to 20 feet apart, so his surface brightness is small.

To measure surface brightness, a "mean" spot should be chosen, one one quarter of the distance between the lights, to avoid the maximum and minimum.

The Chromophotic Index.

Taking the three physical factors in vision, and multiplying them together we get what may be called the "Chromophotic Index' of the mine, and this does appear to bear some relationship to the amount of nystagmus, but it needs confirmation by further investigations.

The Chromophotic Index is found by multiplying the candle power of the light used at a working place, by the surface brightness—in foot candles—of the coal (or ore) at a " mean " place by the colour relief.

Then, in order to get a convenient figure move the decimal point five places to the right.

Example :—

C.P. = .4   S.B. = .0015   C.R. = 2.67

2.67
·4
———
1.068
·0015
———
5340
1068
———
·0016020

Move the decimal five places to the right, INDEX = 160

The Examination of Mines.

The observer is very much in the hands of his guides. He can only ask to be shown into an "average' place, that is, a place about mid way between the fresh air coming in, and the exhausted air going out, and of "average" colour. Then, if the men are not working, he has to depend on what he is told is the " average " distance apart at which the lamps are used

The actual distance is constantly changing, and so the conditions at one time may differ widely from those found at another. In different seams in the same mine, there may be more, or less colour, light, or surface brightness. All this will alter the chromophotic index of the mine, and unless one gets a true "average" the index may be quite misleading.

When examining the mines in the Ebbw Vale District, my friend, Dr. H. Mills, was good enough to accompany me and confirm the observations, and those on the experiments on vision.

With the Holophane Lumeter, the accumulator should be fully charged before each examination. Too prolonged use of the lamp will run down the voltage and the results will not be accurate. The attachment of the flexible wire must be sound.

I find that observations are best made quickly, as soon as photometric balance is found. Too long looking and trying to balance the light exhausts the eye, and then one cannot see until after an interval of rest. The low degrees of light such as the surface brightness of coal are the most difficult to measure. It is best to average several observations.

The Lumeter resembles those sold by Holophane, Ltd., but is one specially adapted for work in mines. The surface—the illumination of which is to be measured—is viewed through an aperture in a white screen. On this screen is thrown a measured amount of light from a standardized electric lamp. The amount of light thrown on the screen is regulated by turning a lever, and when the light on the screen balances that reflected from the surface seen through the central aperture, the result is read off on the scale in foot candles. For higher lights, dark glasses are interposed which allow only one-tenth or one-hundreth of the light to reach the screen.

General Observations.

In coal mines the absolute gloom that surrounds the solitary worker is very striking. I do not wonder at such men getting nystagmus, but when a number of men are working close together, each with his lamp, the light seems good enough.

In anthracite mines there is much less nystagmus than in ordinary coal mines. From figures kindly supplied me by the South Wales Coal Owners' Association, it appears that of 5,262 anthracite colliers there was only one case in 1910, or a percentage of .019, while for 137,385 ordinary colliers it was .17 per cent. I think this is due to the remarkable surface brightness of anthracite. In contrast with coal mines, there is nothing like that gloom in the other mines I have seen. So much more light is reflected from the walls. True, the candle-power has in each case been somewhat greater.

In the Dolcoath mine, at a depth of 2,940 feet, the light from a tallow candle was .97 in one place—not very far from the shaft down which air came. In addition to this, the colour was quite enough to enable one to see with comfort.

In the Levant Higher mine, all the surfaces except a small area where freshly exposed were covered with a rusty iron coloured mud, which oozed out over the rock. This gave quite a good colour.

The surface brightness of it, measured at 3 feet from a candle was .065 foot candle.

The intensity of light would be nine times as much at one foot, or .589 foot candle. That is to say, rather more than half the light is reflected back. Very different from coal mines where it is less than a tenth.

The element of colour seems to me to be the determining factor as to whether there is or is not to be nystagmus.

If, in that part of the Dolcoath mine that I saw—there was only one-tenth of a candle, light, I do not think there would be any nystagmus. For then, the candle-power being .1, the surface brightness would be .0049 and the colour 14, so the chromophotic index would be 686, or half as high again as in coal mines, and in the case of the Levant it would be 1300.

If you look at the table of observations in the mines that do *not* produce nystagmus, you will see that they all have a colour relief of over 10 per cent. and a chromophotic index of over 4,000. Contrast these with mines producing it—the highest colour relief is 3.66 and the chromophotic index is less than 500.

MINES THAT PRODUCE NYSTAGMUS.

Mine.	Lights used.	Candle power at face.	Colour Relief.	Surface brightness at "mean" place.	Lights apart.	Chromo-photic Index.	Nystagmus per cent.
No. 1 Marine, Cwm ...	Marsaut ...	·19	2·55	·00055	18 ft.	26	·89
Prince of Wales Abercarn	Mueseler...	·4	2·67	·0015	17 ft. 6 in.	160	·14
Graig Fawr Red Ash Level	Tallow Candles	·62	2·4	·0028	4 ft. 6 in.	416	·106
Gwaun-Cae-Gurwen Anthracite	Prestwich	·4	3·66	·0028	24 ft.	409	·037
No. 1 Waunlwyd* ...	Marsaut ...	·44*	2·78	·0033*	7 ft.	403*	·80

* Waunlwyd. Observations not reliable, as wire connecting lumeter to the accumulator was found to have been almost cut through at terminal.

MINES THAT DO *NOT* PRODUCE NYSTAGMUS.

Ebbw Vale Clay Level	Candles Wax	1·05	10·66	·0042*	12 ft. 6 in.	4,701	*Nil*
Dolcoath Mine ...	Tallow Candles	·92	14	·049	4 ft. 6 in.	63,112	*Nil*
Levant Higher Mine ...	Tallow Candles	·88	18·6	·065	3 ft.	106,392	*Nil*

* Surface darkened by coal dust from narrow seam above clay.

EXPERIMENTS IN MINES.

Mine.	Lights used.	Candle-Power.	Colour Relief.	Surface brightness.	Lights apart.	Chromo-photic Index.	Nystagmus per cent.
No. 1 Marine	Marsaut ...	.19	2.55	.00055	18 ft.	26	.89
With 2 ft. 6 in. of roof white washed close to face	Marsaut ...	.19	14	.001	18 ft.	266	—
With roof white as above and double light	Doubled Marsauts	.38	14	.0015	18 ft.	798	—
Graig Fawr Red Ash Level	Tallow Candles	.62	2.40	.0028	ft. 6 in.	416	.106
Substituted Ozokerite Candles	Ozokerite Candles	1.2	2.40	.0055	4 ft. 6 in.	1584	—
No. 1 Waunlwyd* ...	Marsaut ...	.44*	2.78	.0033*	7 ft.	403*	.80
Roadway, roof and upper half of sides white washed	Marsaut ...	.44	12.2	.0047	7 ft.	2522	—
Roof white as above and double lights	Doubled Marsauts	.88	12.2	.0056	7 ft.	6012	—

The results of a few experiments are shown in the table. Unfortunately those found at Waun Lwyd Pit are not reliable. The light in the Lumeter did not appear quite satisfactory, and I changed the cell, but without improving it. On reaching home one of the flexible wires was found to be completely broken at the terminal, consequently, if the light in the Lumeter was less than the standard, the photometric balance would give a fictitiously high reading for the candle-power and surface brightness.

A sense of comfort in the eye was noticed where the roof was whitewashed. A fortnight later the colour of it was reported to be "much lighter" than a 50 per cent. [illegible] compared with it.

About 9 to 12 inches of coal is hewn from the face in a day, exposing that much roof. That is all that would have to be whitewashed daily to get a white roof, even supposing so much was necessary to prevent nystagmus, and, there may be other ways of adding colour at less expense.

In increasing the illumination, is it right to deprive the collier of his danger signal—the lamp? It warns him of the presence of gas both by sight, and, I am told, by smell also, while the electric lamp gives no warning at all. It is said that men have been seen to fall down insensible when walking into gas with an electric lamp.

In this connection—let me state that some explosions may be caused by sparks from a steel pick. On my first visit to a coal mine I saw a spark from a pick, and last January I examined the eye of a collier who had "burnt" it with a spark from his pick.

He told me that when using it against hard rock he often saw them, and had burnt his eye with them before.

If miner's tools could be made of a metal that did not spark, this source of danger would be eliminated.

Now, if this theory of the cause of nystagmus is correct, it will explain why there is six times as much at Cwm as at Abercarn, because the chromophotic index at Abercarn is six times as great as it is at Cwm.

In the Gwaun-Cae-Gurwen, and the Graig Fawr, where there is only one case in each, one cannot fix the true percentage.

There are 448 men in the former, and 156 in the latter.

I wish to acknowledge my indebtedness to the management and officials of the Ebbw Vale Company, who have afforded me every facility for examining and making experiments in their mines, and to the management of the other mines inspected; to Dr. H. Mills for his cordial co-operation in the investigations; to Mr. Walter Dixon (Glasgow), our consulting electrician, and Mr. V. Watson, our gas manager, and some gentlemen who have given me considerable help and instruction in the matter of physics, but who desire to remain anonymous, and, finally, to our great poet and philosopher, Francis Bacon, for writing his *Novum Organum.*

Addendum.

The editor kindly permits me to explain the anomaly of the chromophotic index of No. 1 Waunlwyd Pit not being in inverse proportion to the rate of incidence of nystagmus, as it should be. Assuming that the places examined at Abercarn and Cwm were "average" places, then the index for such a place in a mine turning out nystagmus at the rate of ·80 per cent. should be 28 or 29.

The part of the mine examined was in the eastern district, and I suspected that it was not "average." In fact, at the first spot shown me, I refused to make any observations at all on that account. There was a hurricane of wind passing through it.

I have since made a tour round the face of the eastern part, and am satisfied that it was not an "average" place.

In order to find out exactly where to go for one, a plan of the mine has been prepared, showing the air currents, and with all the cases of nystagmus charted on it, indicating where each man was working when he got it.

Five cases occurred in the far end of the east district. Ten were thinly scattered all over the mine except a comparatively small area at the far end of the west district. Here there were ten cases fairly close together.

In this area the last "working place" was recently examined, that is—where the air is most exhausted and de-oxidised, just before it returns by the airway. This would be the worst place, and of course not "average."

Another place was examined mid-way between the fresh air coming in and the exhausted air going out. This is a fair "average" place for that part of the mine, the centre of the west end.

The results of these observations are given below—Marsaut lamps used.

Waunlwyd Pit No. 1 re-examined.

	C.P. at face	Colour Relief	At mean spot surface brightness coal	Lights apart	Chromophotic Index	For whole of mine. Nystagmus per cent.
Worst Place	·1	2·7	·00058	15 feet 6	15	·80
"Average" place.	·22	2·6	·00053	12 feet	30	·80

H. S. ELWORTHY.

ON MINERS' NYSTAGMUS (NEUROSIS).*

BY

THOMAS L. LLEWELLYN, M.D.

TRENTHAM, STAFFORDSHIRE.

I think it will be best if, in the limited time at my disposal, I confine myself chiefly to one aspect of the question—that of the illumination present in the coal mine. Before doing this, however, I wish to make a few general remarks on the incidence of nystagmus in the various coal fields of the Kingdom. Scotland, using proportionately three times as many open lights as England and Wales, has one-fourth the relative number of cases of nystagmus. The naked light districts of the Forest of Dean, Somersetshire, and the "Black Country" are practically free from the disease. The naked light pits of South Wales are almost free, and most of the cases they produce are cases which have come from the surrounding steam coal pits, often deliberately because they have failed to work with lamps. Nystagmus is frequent in the steam coal pits in South Wales, the Midlands, and Yorkshire.

I must also refer to the influence of "holing" on the incidence of the disease. In the steam coal pits of South Wales "holing" is little employed, and nystagmus is frequent; in the naked light pits all the coal is got by "holing" and nystagmus is rare. In Somerset and the Forest of Dean, also, all the coal is obtained by "holing." When a man "holes," his direction of vision is either downwards or directed horizontally forward.

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*A contribution to the discussion on Miners' Nystagmus at the Oxford Ophthalmological Congress on July 19th, 1912.

The slide shows the position assumed at work in a naked light colliery of Wales. The man must strike the coal at or below the level of his eyes if he wishes to take advantage of the swing of the pick. "Holing" has little influence on the incidence of nystagmus except where safety lamps are used. I disagree entirely with the authorities who say that an upward direction of regard is essential in the process of "holing."

Leaving out all my latent cases and taking only the certified cases, out of 527 consecutive cases 504 worked with lamps and 23 with candles. Of the 23 cases who worked with candles 14 had used lamps. Taking my own district, comprising 12,000 men, in which I have seen all the certified cases and know the relative proportion of men working with lamps and candles, I find that nystagmus is six times more frequent in the safety lamp pits, taking into consideration the number of men employed.

There is a general idea that the light given by a candle and safety lamp is nearly equal, and I wish for a few moments to direct your attention to this point. I have taken measurements of the candle-power of the candles used in all the districts I have mentioned, and have always found them at least equal to one standard candle. Some of the tallow candles, when spread out, may give an illumination equal to two candle-power. The safety lamp rarely gives more than half a candle-power. The lamp becomes dirty during work, and may give only one-third of its original candle-power.

Most important of all, the lamp must be placed at a greater distance from the face than the candle owing to the great danger of striking it with the pick, and you will pardon me for reminding you that the illuminating power of a source of light varies inversely with the square of the distance. The total light given by the candle and lamp respectively must also be taken into consideration, and from measurements which I have taken, the total light given by a standard is 4½ times that given by a modern oil safety lamp. The actual relative figures were :—

Standard candle	.635.
Safety lamp	.14.

The lamp also throws shadows and the slides will show this better than any description.

The next slides will show a series of photographs I have taken of lamps and candles under similar conditions. Every negative was given the same exposure and had the same development and I took all the care I could to secure that the conditions were the same in each case.

It will be seen that the area of light given by the candle is 350 degrees, that given by the lamps about 180 or 190 degrees.

It must also be remembered that the coal absorbs almost all the light which falls upon its surface, and measurements I have taken show that anything up to 97 per cent. of the incident light will be absorbed.

Similar measurements show that tin ore obsorbs 80 per cent. and gold quartz 77 per cent.

This slide was taken to show the results of absorption, the same lamp was taken first against a white background and then in a dull blacked box. The difference in the amount of light is very apparent.

I have also taken measurements of the candle-power of the lamps at five large collieries, employing nearly 8,000 men underground. 680 lamps were examined, and great care was taken to ensure similar conditions. The lamps were all trimmed by the manager as they would be used in the pit. Clean and dirty lamps were tested.

The slide shows the percentage of nystagmus, the candle-power of the clean and dirty lamps. The relation between the incidence of nystagmus and the candle power of the lamp is well seen. The pits were worked under almost identical conditions.

Pit.	Men.	Nystagmus.	Per cent.	Clean Lamp c.p.	Dirty Lamp c.p.
A	450	9	2	.235	.22
B	1500	22	1.57	.27	.2
C	1500	10	.66	.33	.25
D	2500	14	.56	.40	.27
E	1900	9	.42	.42	.28

I have also taken photometric readings of the light falling on the coal face in different collieries.

	Naked light pits.	Safety lamp pits.
1	·12 foot-candles	·026 foot-candles
2	·09 ,,	·022 ,,
3	·056 ,,	·016 ,,
4	·11 ,,	·015 ,,
5	·08 ,,	·0147 ,,

The average illumination of the coal face in the naked light pits was ·09 foot-candle, the safety lamp pit average was ·018 foot-candle. The illumination at the face, then, was five times as great in the naked light pits as in the safety lamp pits, and I must be pardoned if I draw your attention once more to the fact that the incidence of nystagmus in a safety lamp pit is six times as great as in a candle pit.

I wish to call your attention to the personal factor of the disease, a factor which I think has been too much neglected in the past. Why should men working under precisely similar circumstances suffer unequally? I have called attention elsewhere to the frequency of error of refraction; 90 per cent. of all the cases I was able to examine suffered from some error. In *The Pathology of the Eye*, Parsons gives a table showing the percentage of ametropia in the general population to be 70 per cent.; so my figures mean that error of refraction occurs 20 per cent. more frequently in nystagmus than in the general public. The second point to which I have called attention is the greater frequency of the disease in people of fair colouring.

The preventive measures I advocate are: (1) an improvement in the candle-power of the miners' lamp, and (2) a preliminary test of vision before the man is employed underground. The best means of improving the light is to introduce an electric safety lamp which alone will give the necessary candle-power. The electric lamp is safer than the oil lamp, but is more expensive, especially in its initial cost.

This slide was made from a photograph taken of three lamps which were returned at the end of *one* shift from one colliery. A damaged safety lamp becomes an open light, while a damaged electric lamp goes out. I will throw on the screen a slide showing an electric lamp which I have designed. The lamp is only in a skeleton form. The bulb gives 4 c.p.

In conclusion, I will throw on the screen a few slides illustrating points in the disease :—

(1) Various types of lamp—modern, Stephenson, open Scotch lamp.
(2) Case of nystagmus showing photophobia.
(3) Case of nystagmus showing mental depression.
(4) Case showing the backward and oblique tilt of the head.
(5) Slide showing results of examination for fire-damp testing.
(6) Slide showing statistics of nystagmus and relation to illumination.

Examination of Fire-damp.

				Gas present.					
				Trace.	1%		2%		3%
	Number tested.	Correct.	Fairly correct.	Failed.	Failed.	Incorrect.	Failed.	Incorrect.	
Normal	39	22	6	11	2	8	0	11	Seen by all
Nystagmus Cases ...	33	2	6	15	5	13	2	11	

Rhymney Valley District.

	Men	Cases of Nystagmus	Relative per cent.	Illumination at Coal Face in Foot-candles.	Relative per cent.
Lamps	7.5	46	6	.018	1
Candles	1	1	1	.09	5

COAL MINERS' NYSTAGMUS.*

BY

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In considering the subject of coal miners' nystagmus, we are all naturally turning our attention to discover the immediate exciting cause thereof with a view to its elimination, in order that we may be able to rid a certain portion of the labouring community of a considerable amount of trouble, and probably the whole community of some expense. Apart from the actual pathology of coal miners' nystagmus, a broad survey of the statistical facts at hand shows us that since the disease was first described some fifty years ago the case-incidence has risen from practically *nil* to a considerable percentage amongst colliers. The increase corresponds with the introduction of lamps, beginning with the Davy lamp. Improvements in lamps, *i.e.*, in the increase in the amount of their illumination, have affected a decrease, and we are told that the introduction of the Wolf benzine lamp has diminished the case-incidence by 50 per cent. in the mines in which it has been introduced. It is apparent then that more or less the case-incidence of the disease varies in inverse proportion to the degree of illumination obtained in the pit. (Nuël, of course, states this definitely.[1]) Practically speaking, there are only two conditions in the mine which have varied during the variations in the case-incidence of the disease: they are alteration in lighting and alteration or increase in the mine depth. The latter is evidently not of great account, for whilst there has been an average steady increase in depth, the case-incidence has not, as far as is known, corresponded in proportion. Conditions, which have not altered, are the men themselves, with their refractive errors and the position in which they work, etc.

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* A contribution to the discussion on Coal Miners' Nystagmus at the Oxford Ophthalmological Congress on July 19th, 1912.

It is obvious, then, that illumination is the one factor we have to consider, and, apparently, chiefly in respect of its amount or candle-power.

If now we consider the candle-power of the various sources of illumination which have been used and are in use in the mines, we note that the old candles gave an illumination =.5 to .7 c.p., the Davy lamp gave .28 c.p., and various other lamps giving varying amounts up to .87 c.p., which the Wolf benzine lamp gives.

We know that nearly all the illuminating power of the old candle was available, because it could be placed close to the site of work, say, within three inches, whilst less of the illumination of the Wolf benzine is available, because it cannot be placed within less than two feet of the work, and also because of the protecting media surrounding the lamp. Now, if this loss in power brings the value of the two sources equal, we should expect that the introduction of the Wolf benzine lamp in any mine would make the working conditions the same as if it was lit by candles, and would therefore eliminate, or nearly eliminate, the disease.

We are informed, however, that the introduction of the Wolf benzine lamp reduces the case-incidence to 50 per cent., and we must then presumably wait for statistics which will show us that the continued use of the Wolf lamp has eliminated the disease, and until we have these statistics we cannot say definitely that it is only the candle-power, or the amount of illumination, which is the ætiological factor.

This brings me to my suggestion, which is that another factor, namely, the character of the illumination, ought to be considered.

When nystagmus was practically non-existent, the old tallow-candle, an animal or vegetable fat, was in use; ever since a mineral hydrocarbon has been in use nystagmus has been known, and although, as we have seen, improvements in the amount of the illumination have effected a decrease, it has not reduced the incidence of the disease to the degree present in the days of the candle. Broadly speaking, the tallow-candle flame is less rich in ultra-violet rays than is the hydro-carbon flame, and the harmful action of ultra-violet rays upon the retina is acknowledged; and, moreover, until we know to the contrary, there may exist other rays which have a deleterious effect upon the retina when that structure is exposed to them over prolonged periods, and these rays may perhaps bear their part in the production of coal miners' nystagmus and its various symptoms. I therefore suggest that it would be of something more than mere scientific interest to be able to compare the spectrum of the naked tallow-candle flame with the spectra of the various hydro-carbon flames surrounded by the particular glass which is in use in the different lamps of the present day.

I have no new theory to bring forward as to the actual pathology of coal miners' nystagmus, but it seems to me that the associated set of symptoms which are now generally called "neurosis" point more and more to the view that the situation of the lesion is chiefly in the higher centres of co-ordination.

There is a small experiment which I should like to recall to you as giving some idea of what actually takes place in the miner's eye when he is at work. If in a dark room you gaze with one eye only at a tiny spot of light, violet for preference, you will note after a minute or two the spot appears to move more or less in a small circle, and a little later continually in one direction only. With most people this is an upward one, although with some it is horizontal and more rarely downwards. Presumably, the explanation is that the fovea is insufficiently stimulated with light and the eye seeks to place the image on the perimacular ring. Perhaps the explanation of the subsequent movement is that with most people the distance from the fovea to the perimacular ring is shortest vertically, and the eye naturally seeks the shortest route, and with others the horizontal radius may be the shorter. On the other hand, a small muscular imbalance may be responsible. The "1,000 yard" opening in the Edridge-Green lantern with neutral purple is very convenient for the experiment.

In view of this discussion, I have taken the opportunity to review my last twenty-four cases, and wish to bring forward, without wearying you with statistics, some clinical points which I think may be not without interest.

Age onset of symptoms (as noted by the patient himself), varies from 24 to 64 years, and averages 41.79 years, a figure higher than usual.

The number of years at work before symptoms appeared varies from 3 to 53.5 years and averages 29.5, again a figure higher than usual.

The length of time work was carried on with symptoms was 11.8 months.

Occupation.—The majority were stallmen and had worked in various positions, but, on the whole, and especially recently, more in an upright position than any other.

Number of attacks.- All were first attacks, except in three, of whom one was a second, and the other two, third attacks, the rate of recovery being from three-and-a-half to twelve months variously. These, however, being personal statements cannot be relied on too greatly.

Previous illness or injury.—Two had had recent illnesses, and five injuries; three very slight only.

General condition.—In all, except three who were evidently in poor health, the general condition of the men was remarkably good. No definite nerve lesion was noted in any, though exaggerated knee-jerks existed in three, an observation of small value.

There seems to be no evidence at present of the "unknown quantity" of the nervous system which makes one man a victim and allows others to escape, although surely some such factor must exist.

Vision.—This varied from 2/60 to normal. In most cases the refraction errors were insignificant and in none were they high. Hypermetropia and hypermetropic astigmatism predominated slightly. I am convinced that refractive errors have no special connection with the disease.

Spasm of accommodation was present in several cases, in one, to a marked degree. It appears to exist in a slight degree in a great many cases.

In the case which presented marked spasm the actual nystagmic movements disappeared in 6 months, and could not be elicited by any known test, but during that time the spasm had increased.

With reference to the relationship between ciliary contraction and nystagmus, the case of voluntary nystagmus published in 1909 by Lafon and Bonnett[2] is not without bearing, for here powerful ciliary contraction took place whenever the individual induced the nystagmus.

The relationship of the central vision to nystagmus appears to be a very interesting one. In certain cases there was a reduction of vision present when nystagmic movements were absent, even under the ophthalmoscope, when the refractive error had been fully corrected and when no spasm of accommodation co-existed. In some few of these I found slight concentric contraction of the fields of vision for white and colours (red and blue) in their proper order, but ophthalmoscopic signs were absent.

Doubtless, this indicates some change in the visual tracts, but it is difficult to say where. Considering the fact, however, that some of these recovered normal vision, I suggest that the change lies in impaired nutrition of the retina from the prolonged action of ultra-violet rays.

Fields of vision.—These were obtainable and obtained in thirteen cases Of these, four were normal, and in six there was slight contraction for white and colours in their correct order. In the remaining three there was marked concentric contraction for white and colours, and also dyschromatopsia for red and blue.

It is desired to make special mention of this, as it does not appear to have been described before, but, on the contrary, Dransart and Famechon[3] distinctly stated in 1908 that they found no dyschromatopsia in their cases. Of the three cases one had suffered a previous attack of nystagmus, in another the dyschromatopsia was not observed until a second examination six months after the first which had been made at the time of ceasing work.

I have not had the opportunity of making a subsequent examination of either of the three and am therefore unable to say whether the sign is permanent or not.

In several of these thirteen cases the fields were taken on subsequent occasions and it was found that the extent of the fields increased much in the proportion that the central vision increased. In one case, however, that of a one-eyed man who developed the disease at the age of 58, the contraction persisted after all signs and symptoms of nystagmus had disappeared, and was doubtless due to optic atrophy, but whether this was due to the remote effects of nystagmus or to another cause it is impossible to say.

Type of nystagmus.—In nineteen cases the movements were circular, varying from a slight to a marked degree; in one other, they were vertical chiefly, but with some rotation; and in another mixed.

In three cases no nystagmic movements were present or could be invoked by any method. One of these is interesting in that miners' neurosis was present without nystagmic movements, for he had been examined one week after leaving work by an experienced ophthalmologist who found no definite nystagmus but definite neurosis; by another surgeon six months later, who found the same, and again a year later by myself, and I was unable to find true nystagmus, though marked signs of neurosis were present.

This case may be regarded as evidence in support of Weeker's theory, namely, that neurosis is a condition running side by side with nystagmus, and that it may become grafted on the nystagmus, although doubtless arising from work in the mine.

Neurosis.—Signs of this condition were present in half the patients, in three of whom they appeared after the nystagmus had existed for some time.

Spasm of the orbicularis was far the most frequent. Three cases showed head-nodding and general tremor. I have noted that signs of neurosis frequently increase, although the actual nystagmus may be improving.

Night-blindness.—This was undoubtedly present in six of the cases, as shown by a diminution of the fields of vision and central vision in reduced light, in addition to complaints such as "I have to take a lantern with me to find my way at dusk."

REFERENCES.

1. **Nuel.**—*Bullétin de la Société Belge d'Ophtalmologie*, No. 24, p. 47.
2. **Lafon and Bonnett.**—*Recueil d'Ophtalmologie*, octobre, 1909.
3. **Dransart and Famechon.**—*Ibid.*, abstracted in THE OPHTHALMOSCOPE, Vol. VI, p. 632.

GONORRHŒAL IRIDO-CYCLITIS, WITH OBSERVATIONS ON ITS RELATION TO SO-CALLED "RHEUMATIC IRITIS."

BY

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Introductory.

IT is quite certain that even mild cases of iritis are accompanied by cyclitis, and the term "irido-cyclitis" is therefore more correct and less misleading than the term "iritis." There is evidence for this assertion. Byers[1] in 1908 quoted a very interesting case in which he had the opportunity of pathologically examining an eye infected with the gonococcus. Clinically, the case was one of mild iritis, yet, on examination, the ciliary body was much affected with an exudate of a highly cellular character; no gonococci were demonstrated in sections, and he was inclined to attribute the irido-cyclitis to a gonotoxin, Friedenwald[2] in 1896 states that with a sufficiently high magnification. "cyclitic dots" on the cornea could be discovered in every case of iritis, In Byers' case quoted above, "cyclitic dots" on the cornea were found. but only under the microscope.

Speaking from personal experience, I find that cellular deposit on the cornea is much less marked in gonorrhœal irido-cyclitis than in any other type. This is probably entirely a question of the amount of agglutins produced by the poison.

Interest in cases of acute irido-cyclitis chiefly centres around those of obscure ætiology. In a large percentage of cases there is no difficulty whatever in determining the cause of an attack, but a number of cases have been classed together under the title "rheumatic iritis," partly on account of their obscure ætiology, and partly because the acute eye trouble was accompanied or preceded by rheumatism, articular or muscular, or both. but chiefly the former.

The cases I hereafter quote strongly point to the conclusion that these "rheumatic" cases are really gonococcal, and that the term "rheumatic irido-cyclitis" should be reserved for those very *rare* cases which accompany acute rheumatism.

Opinion has been very much divided of recent years on this question of the reality of rheumatic irido-cyclitis. W. M. Beaumont[3], of Bath, has since 1908 drawn the attention of ophthalmic surgeons to the question, and regards gonorrhœa as the cause of many of them. The cases he quotes are, however, very incomplete, and no definite search was made for the gonococcus.

Nature of an Attack.

It has been often assumed that a gonorrhœal irido-cyclitis is clinically a very typical condition, differing from other forms of acute .irido-cyclitis. There certainly is *one type* of acute irido-cyclitis which can be recognised almost at a glance as gonorrhœal. This is characterised by an intense injection of the ocular conjunctiva and sclera with a rather bright cornea, absence of exudation and cellular elements into the anterior chamber and of posterior synechiæ, and very severe pain in the eye and head and photophobia. But this is only one type. As a matter of fact, gonorrhœal irido-cyclitis may be protean in its characters. Sometimes, it is in the form of a plastic irido-cyclitis, with or without hypopyon ; less often, it is hæmorrhagic in type. Other cases are accompanied by *slight pain*, with or without adhesions to the anterior capsule of the lens. In some very severe cases there is considerable vitreous opacity, and, for the time being, greatly reduced vision, but, without exception, I find the final result to be far more favourable than in any other form of acute irido-cyclitis. Many cases are very obdurate to treatment, although since I began treatment by vaccine such are becoming fewer.

The attacks are always unilateral in my experience, although each eye is usually attacked at different times. Another feature is the tendency for the attacks to recur, the interval between the attacks in the series of cases below varying from a few months to ten years.

This question of recurrence is of interest. No doubt, the primary eye attack leaves behind a tendency to further attack, although for a time there may be an immunity conferred. It is more probable that a second attack is due to a fresh supply of gonococci from the neighbourhood of the urethra rather than that some cocci have remained latent in the ciliary body or iris and acquired a fresh malignancy.

I can find no definite time fixed as the longest that the gonococcus can continue to exist in the urethra and its diverticula. Case I in the following list proves that they can be demonstrated *thirty years* after the *first and only* attack of gonorrhœa ; in other cases the period was twenty years, fourteen years, and eight years.

In nearly all cases " rheumatism " makes its appearance between the primary infection and the first attack of iritis. The " rheumatism " is very persistent and intractable. It may be entirely muscular, but more frequently it is articular, affecting one or many joints and causing resort to Spas and inability to work for months at a time (*Vide* Cases I and IX).

Prognosis.

Prognosis is exceedingly good. Even with sight reduced to counting fingers at a metre, it may be confidently prophesied that quite good vision will be eventually restored. The results are almost diagnostic of the condition, and in marked contrast to severe syphilitic irido-cyclitis.

Diagnosis.

Diagnosis is frequently quite easy when there is a history of a recent gonorrhœa, and when the irido-cyclitis is of the intense painful type before mentioned, with but little exudation and no cellular deposits. When, however, there is no such history, when the inflammation is not so typical, and "rheumatism" for years past has been the chief trouble, the gonococcus may be overlooked and the case be classed as "rheumatic."

In any given case of acute irido-cyclitis, syphilis must, of course, be first excluded, although in my own practice I do not find it at all a common cause, possibly because better-class patients subject themselves to a more thorough course of anti-syphilitic treatment than do hospital patients. If there is reasonable doubt, the Wassermann test should assist the surgeon in coming to a decision. An intractable case of plastic irido-cyclitis affecting both eyes at the same time is much more likely to be syphilitic than gonorrhœal.

It is necessary to be still more careful in considering whether a given case is gonorrhœal or not, as it leaves no stigmata behind except "rheumatism," which, for the most part, is not regarded as gonorrhœal; a distant "clap" may be forgotten or not noticed on account of its slight symptoms, as in Case IV. Cross-examination is therefore not sufficient. First, the urethra must be examined for any trace of "gleet"; secondly, the urine should be passed in a glass beaker and examined for "clap shreds" (comma or cork-screw types). Thirdly, even if the urine is quite clear, one should go a step further, and massage the prostate and vesiculæ seminales through the rectum; the urine should then be passed and carefully examined; as in Case II, "clap shreds" may then be detected. Having demonstrated the shreds, they are allowed to settle. The overlying urine is drawn off and the deposit is centrifugalised. The deposit is stained for gonococci, and they may be demonstrable, even thirty years after an attack of gonorrhœa, as in Case I.

In the nine cases which I briefly quote, each had had previous attacks of iritis, *which had been diagnosed as "rheumatic,"* yet in eight the gonococcus was demonstrated in the "clap shreds" and the diagnosis thereby placed on a sure footing. The first four cases occurred in my own practice, since Case I drew my attention to this subject, and the second series at the Central London Ophthalmic Hospital. I am much indebted to Mr. Stephen Mayou for allowing me to investigate and to publish the latter, and I also have to thank Mr. Mayou for the bacteriological reports.

The following list contains no case of undoubted gonorrhœal irido-cyclitis following soon after an acute urethral infection, nor where an acute exacerbation of the urethral condition existed and was complained of.

In the following cases "gleet" for the most part was denied, and in four cases was certainly not found on examination.

Private Cases.

Case I.—Male, aged 52 years. Very intense irido-cyclitis. *Single* attack of gonorrhœa over 30 years ago; neglected, with resulting stricture and gleet. Denies syphilis and there are no signs to suggest it. Three attacks of iritis, the last one ten years ago and the two previous ones about twenty years ago. He has always suffered from "rheumatism." Ten years ago he was crippled and unable to work for nine months, chiefly in the feet, but other joints were also affected. Vision on first visit: fingers counted at one metre. Urine examined; many "clap-shreds" present: centrifugalised and many gonococci found, also staphylococci. This case was more fully described in THE OPHTHALMOSCOPE of June, 1912. Resulting vision with correction=6/6 (2 letters).

This case proves that the gonococcus can exist in the urethral tract for thirty years and retain its activity, and that in spite of three severe attacks of irido-cyclitis, the resulting vision is good. The "rheumatism" was gonorrhœal, and cured by gonococcus vaccine.

Case II.—F. B. B., male, aged 44 years, left acute irido-cyclitis, some exudation in pupil with posterior synechiæ.

First attack of gonorrhœa when aged 19 years; ill for six months and suffered from "gleet" for three years. Second attack at 30 years of age. This attack was complicated with gonorrhœal rheumatism affecting left wrist, both insteps, the back of the neck, and the loins. Ill twelve months. First attack of iritis twelve months after the rheumatism, *i.e.*, fourteen years ago. Since then he has had several attacks of iritis in each eye, but the two eyes have never been simultaneously affected. *Urine*: no "clap-shreds" on first examination; urine passed after massage of prostate, etc., *per rectum* contained well-marked comma shreds. On centrifugalising the deposit, gonococci were demonstrated. Resulting vision—right eye 6/5, left 6/6, with correction.

In this case, the gonococcus persisted in the prostate for fourteen years, The case showed no "clap-shreds" until they had been expressed from the prostate gland by massage, and the ocular condition might easily have been classed as "rheumatic." Vaccine cured the so-called rheumatism and greatly assisted in the cure of the irido-cyclitis.

Case III.—E.P., male, aged 38 years. Acute irido-cyclitis right eye. Gonorrhœa twenty years ago. No history of syphilis. Suffered from muscular rheumatism for fifteen years, also some joint trouble. Left eye inflamed twelve years ago. Present attack began one week ago; posterior synechiæ below. Intense pain, relieved by leeches. Pigment on anterior capsule of lens; no cyclitic dots. T. - 1. Great improvement after injection of gonococcus vaccine (dose 20 millions). Final vision 6/6. *Urine*: Full of "clap-shreds." Deposit centrifugalised, and numerous gonococci found.

In this case the only attack of gonorrhœa was twenty years ago, yet the gonococcus was easily found when looked for. The usual sequence was present, *viz.*:—gonorrhœa—rheumatism, articular and muscular—irido-cyclitis.

Case IV.—I. W., male, aged 29 years. Acute irido-cyclitis left eye. Same eye attacked severely six months ago. No cyclitic dots. Pain but slight. Vision, 1/60. T.—1. Denies any knowledge of an attack of gonorrhœa, but confesses to frequent exposure over a period of nine years. Four years ago he was incapacitated with rheumatism in the hips and knees. Twelve months ago he had another attack of rheumatism in the ankles and feet, and it has been very troublesome ever since.

One week before the onset of the eye trouble, an acute attack of acne of the face made its appearance, and the author had never before seen so virulent an attack of pustular acne. In the absence of a history of gonorrhœa, it was first considered possible that the irido-cyclitis was due to a septic infection. Examination of the urethra, however, showed a slight but quite definite "gleet," and on passing urine, well-marked "clap-shreds" were discovered. Gonococci were subsequently found in the deposit. Treated with vaccine, in three weeks the eye was quiet, and vision =6/6 with —1D. spherical lens.

It is unusual for a first attack of gonorrhœa to pass unnoticed by the infected individual, yet I am disposed to accept this patient's account of his troubles. He was frequently exposed to infection after the age of 18 years, and I have no doubt he was infected previous to his first attack of "rheumatism."

Hospital Cases.

Case V.—T. C., aged 41 years. Acute irido-cyclitis right eye, subsiding; first attack one month ago.

Rheumatism affecting the joints and muscles since Christmas, 1911. Since that date he has been quite unable to work. Gonorrhœa at 21 years, 24 years, and 33 years of age. *Urine.*—Small "clap-shreds." A few gonococci were found with difficulty.

Case VI.—W. H., male, aged 40 years. Acute irido-cyclitis right eye. Left eye had just recovered from a similar attack. Regarded as "rheumatic." Gonorrhœa *denied* at first visit, but acknowledged after "clap-shreds" were found in the urine. First and only attack of gonorrhœa two years ago. Slight attack treated for ten weeks. Not much "rheumatism." Treated with vaccine. Resulting vision, 6/5. As in Case IV, gonorrhœa was denied.

Case VII.—S. S., aged 36 years. Acute irido-cyclitis left eye. Four previous attacks of irido-cyclitis in same eye. First attack six years ago. No history of syphilis. First attack of gonorrhœa thirteen years ago. Second attack three years ago, complicated with severe articular rheumatism of all the joints. Has always been treated for "rheumatic iritis." *Urine.*—Small "clap-shreds" present. Gonococci found.

This case is unusual, inasmuch as the first attack of iritis preceded the "rheumatism."

Case VIII.—S. P., male, aged 34 years, First and only attack of gonorrhœa 14 years ago. Never had syphilis. Has not suffered from "gleet." First attack of irido-cyclitis seven years ago. Second attack three years ago. Present attack began ten days ago. Very intense. Iritis with hypopyon. The iris did not dilate well under atropine. Posterior synechiæ in lower segment. Rheumatism troublesome at times. Has been always treated for "rheumatic iritis." *Urine.*—"Clap-shreds" well marked. Gonococci found on centrifugalising the deposit.

Case IX.—G. J., male, aged 49 years. *Oct. 23rd*, 1912.—Commencing attack of irido-cyclitis, the sixth. No history of syphilis. Attack of gonorrhœa 25 years ago—not severe. Eighteen years ago he was in bed for eleven weeks with severe rheumatism and incapacitated from work for twelve months ; since then he has never been free from "rheumatism."

Eleven years ago he suffered from first attack of irido-cyclitis—right eye—not intense, but very obstinate to treatment. Four subsequent attacks, all very protracted and troublesome to treat, and always ascribed to "rheumatism."

Right vision 6/5 pt. Left vision 6/12 pt. Urine clear—no "clap-shreds." *Oct. 26th*, 1912.—Vision, 6/36. Pigment on anterior lens capsule. One or two "clap-shreds" in urine. No gonococci found, but pneumococci very numerous.

This is the only case in which the gonoccocus was not found : a further bacteriological examination will be made.

Treatment.

Little need be said on this point. Leeches give most relief to the intense pain, and aspirin administered at bedtime is useful. All the cases, except the last, were treated with a gonococcus vaccine of mixed strains, supplied by Messrs. Burroughs, Wellcome, & Co., and I am satisfied that its use materially shortened the attacks. A dose of twenty millions was used.

Incidentally, I may mention that the effect of gonococcus vaccine on the "rheumatism" associated with these cases was rapid and effected complete relief.

Refractive errors should be carefully estimated after the irido-cyclitis is quite well.

Conclusion.

I am of opinion that the *acute* cases which in the past have been classed as "rheumatic" are mostly, if not all, gonorrhœal in origin, and that the gonococcus is by far the most common cause of *acute* irido-cyclitis. I admit that the gonococcus has never been found in the aqueous.*

Byers, from his pathological examination of an eye suffering from gonorrhœal irido-cyclitis, concludes that the inflammation is the result of a toxin. If this is the case, it should be feasible to prevent recurrences by curing the urethral discharge, and it is the ophthalmic surgeon's duty to urge on his patient the importance of special treatment for the urethral disease, in order to lessen the possibility of recurrence of the eye trouble.

The presence of the gonococcus in the urethra and its diverticula is so constant in these cases of irido-cyclitis that it must be looked upon as the cause. It must also be admitted that in addition to the gonococcus, there were present numerous staphylococci in most of the urinary deposits. I do not regard these as a likely cause of the *acute* eye condition ; for in my experience, chronic septic processes chiefly produce a chronic irido-cyclitis, with much cellular deposit on the cornea.

REFERENCES.

[1] **Byers'** *Study of Ocular Manifestations of Systemic Gonorrhœa*, February, 1908.
[2] **Friedenwald**, *Arch. of Ophthalmology*, 1896, p. 191.
[3] **Beaumont**, *British Medical Journal*, July 18th, 1908.

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* Personally, I have not found it necessary to perform paracentesis of the anterior chamber in any of my cases, and it is more than likely that the fluid in the anterior chamber does not contain gonococci, as they have probably been destroyed by the intensity of the inflammatory process.

NOVELTIES.

A GLASS SWAB-HOLDER.

BY

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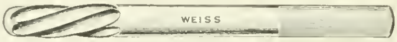
ANYBODY who has read Dr. Ernest Thomson's several articles on continental eye clinics published during the course of the present year in THE OPHTHALMOSCOPE can scarcely have failed to notice that in some of the places he describes, notably in the Dimmer *klinik* at Vienna, the ordinary cotton swab used during operations on the eye is replaced by a swab mounted on a glass rod. The innovation is distinctly one to be welcomed. It is obvious that such a plan has advantages over the more usual method. For example, there is no chance of the swab becoming contaminated by the fingers: the use of the little appliance does not interfere much with a view of the parts; and, finally, it tends to greater precision, accuracy, and delicacy in soaking up any blood or discharges.

In order to popularise the employment of such swabs, I have induced Messrs John Weiss and Son, Limited, of 287, Oxford Street, W., to make the small appliance shown in the accompanying illustration. As will be seen by inspection of the figure, it is merely a glass rod, the length of which is two inches. One end, that intended to hold the cotton-wool, is fluted askew, so as to take up the wool readily and to hold it securely, while the other is slightly roughened, so as to render the rod easier to hold. The twisted end of the little instrument is plunged into the cotton-wool, of which by a few turns of the rod a sufficient quantity is engaged. The armed rod is placed in the steriliser, and after that is used to an eye without the cotton being touched by anybody's finger. If it absorb too much moisture in the steam steriliser, it can easily be squeezed dry by a nurse who wears sterilised rubber gloves.



NOTES FROM SOME CONTINENTAL EYE CLINIQUES.

(*Eighth Article*)

BY

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VII.—WÜRZBURG.

I had looked forward, with considerable interest and pleasure, to a week in the *klinik* of Professor Hess at Würzburg,* but an untimely attack of influenza played havoc with my plans, not only so far as Würzburg was concerned, but also in respect of yet other *kliniks* which I was unable to visit. The present article is on that account shorter than otherwise it would have been, and is the last of the series of descriptions of individual Continental hospitals from my pen. A final article may, perhaps, yet appear, comparing and contrasting British and Continental ophthalmological methods so far as I was able to observe them in the course of my travels, necessarily limited as these were by the fact that it is hardly possible to grasp the details of a *klinik* in less than a week, and often impossible to see much operative work in that time.

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* Since the time when I was in Würzburg, Professor Hess has accepted the Chair at Münich, rendered vacant by the death of Professor Eversbusch.

The Würzburg *Augenklinik* is a handsome square block with large lofty rooms and passages. It seems to bear a considerable resemblance to that of Haab in Zürich. Close by is the laboratory in which Röntgen worked; a mural tablet indicates the fact. The *Augenklinik* contains sixty-five beds. Between 7,000 and 8,000 patients attend annually. On the main ground floor are the Out-patient Department, the Lecture Hall, the Professor's rooms, and the spacious laboratories. Upstairs are the Operating Room and the Wards.

The Out-Patient Department

consists of a series of rooms opening one off the other in the following order, namely, Waiting Room, Consulting Room (*Behandlungszimmer*), Ophthalmoscopic Dark Room, Refraction Room. Beyond the last-named, and opening off it, are the Professor's Room and private Laboratory.

Of these the *Ophthalmoscopic Dark Room* calls for a special description, since its arrangements are such as I had not seen before.

It is by no means a large room, having accommodation for only three ophthalmoscopists, and partitions or screens are absent. Considerable space in one corner is occupied by the Hess skiascope. The Sachs transilluminator, with a chin rest, is in a second corner, and the corneal microscope in a third corner.

The special point about this dark room is that electric ophthalmoscopes are the standard fitment. I shall endeavour to describe one of the "bays," although, indeed, that word hardly applies in the absence of partitions.

Standing out from the wall, at a convenient height, is a table some fifteen inches square. In this is a drawer for sundries. Above the table, attached to the wall, is a series of leather pockets. In these pockets are kept the various mirrors, and the electric ophthalmoscope. Stools on the floor accommodate surgeon and patient. Above the range of leather pockets is a wood block to which is attached a two feet length of flexible metal tubing carrying a Nernst electric bulb. This can be placed in any position suitable for focal or general illumination.

To one side of the table, and at a slightly higher level, is a board fitted with (1) a resistance controlled by a rotating disc and volt indicator, (2) a plug connecting the resistance to the street mains, (3) a switch, (4) a tell-tale lamp to indicate that the ophthalmoscope is in circuit, and, (5) terminals from which the leads are taken to the ophthalmoscope. The last-named, when not in use, is lodged in one of the leather pockets, and if by chance the observer has left it in circuit, as he is very apt to do, the tell-tale lamp on the resistance board informs the next person who enters the room that this is so. Close beside the resistance board is a rack of drop bottles for atropine, homatropine, cocaine, and eserine.

The corneal microscope is differently arranged from others I have seen. Within defined limits the microscope is movable in all directions on a firm table. Only the fine adjustment is made by means of a screw. For illumination a Nernst lamp in a special tube, and mounted on a *separate* movable standard, is employed. Thus the illumination and the obliquity can be varied as desired.

Retinoscopy is performed at 125 cms. by means of the Hess skiascope and concave mirror, usually with the undilated pupil. Hess, as is well known, is a firm advocate of the method of retinoscopy without mydriasis or cycloplegia in all but exceptional cases, notably in the youngest children, and holds that ciliary spasm hardly exists. His views on this method, which, for hospital work at any rate, does not appeal favourably to a great many surgeons, will be found in his volume of the Graefe-Saemisch *Handbuch* dealing with Refraction and Accommodation. I tried skiaskopy under the above-mentioned conditions, and found it difficult, although, doubtless, a slightly defective light-sense makes it more difficult for myself than for many others.

There is nothing very special about the *Refraction Room.* It has three stances and contains a considerable amount of accessory apparatus.

In every German *klinik* one finds apparatus for the detection of malingering. Here the Symens simulation types are in use. These are based on the principle of showing the examinee successive letters of irregularly varying size. He fails to remember the size he has previously read, and makes blunders accordingly. The observer reads on a separate scale the visual acuity represented by each letter, figure, or number.

There is in this room a useful chart for the mapping out and recording of diplopia in ocular palsies.

Operative Technique.

It is much to be regretted that circumstances prevented me from witnessing many of the Professor's operations. I had, nevertheless, the pleasure of seeing some cataract extractions performed with the small basal iridectomy, and shall give here the Hess cataract *technique.*

Examination of the Conjunctiva.—Hess is one of the operators who do not believe in the necessity of elaborate prophylactic bacteriological examination of the field of operation in every case. At the same time, he claims the most excellent results: 900 extractions without suppuration.

If there is visible conjunctivitis, the operation is postponed. That goes without saying. If, on the other hand, the conjunctiva presents no sign of inflammation or abnormality, and stands the test to be described, Hess operates without making a bacteriological examination. The eye is washed out with 1 in 10,000 sublimate twelve hours before the proposed operation, and a shield is placed over it to prevent meddling by the patient's fingers. No bandaging is allowed. If no discharge is visible after twelve hours, the operation is performed.

Preparation for Operation.—Retractors, forceps, and so on, are boiled in soda solution. Knives are placed for a moment in 5 per cent. carbolic acid, and are then dipped for a moment in the boiling soda in the sterilizer. The operator and assistants wear no masks. Hess considers masks quite unnecessary for eye operations. The assistants, but not the operator, wear rubber gloves. The operator *stands* in front of the patient, and operates on the left eye with the right hand and on the right eye with the left hand.

Extraction of Cataract.—As already stated, the conjunctival sac has been flushed out with sublimate twelve hours previously, and has been protected from contact with other parts by means of a Fuchs' wire shield. *The pupil has been dilated with atropine,* 1 drop of 1 per cent. the night before, and 1 drop on the morning of operation. The pupil is therefore fully dilated when the patient comes on the table. The skin has been prepared by cleansing with benzine, soap, and sublimate. Five per cent. cocaine is instilled once or twice, and 10 per cent. just before the operation.

The lids are taken charge of by the assistant. A special retractor is employed. This retractor (Graefe-Saemisch *Handbuch*, Bd. VI) is in general shape like that of Desmarres, but it consists of two blades one inside the other (or behind the other like two spoons laid side by side), fenestrated not solid, such that the inner, or under, blade can be slid close up to the outer, or upper; or, on the other hand, can be drawn away from it. Thus the two blades form a clamp between the parts of which a piece of sterilizable waterproof tissue (battist) can be fixed. This tissue has been cut of such a shape that when it is clamped between the two blades it not only fills up the fenestrae, but extends on either side in such a way that the whole lid margin, and particularly the skin at the inner canthus and the caruncle, are prevented from making accidental contact with the knife, while the wound is fully protected from contact with the lid.

The retractors, thus guarded, having been passed under the lids, the conjunctiva is flushed out with 1 in 10,000 sublimate, and the operation immediately performed.

The section is made fairly large, with a conjunctival flap. The capsule is removed with the Hess pattern capsule forceps. The lens is made to present by means of a special curved spatula or "pusher" (*Linsenausschieber*) applied to the lower part of the cornea and made to follow up the lens in its delivery. When the lens nucleus has been delivered a special instrument, the shovel (*Schaufel*) of Hess, is introduced between the lips of the wound. Into this shovel any remaining cortex is stroked, the movements being similar to those by which one would sweep ashes into a fire shovel; and, indeed, the cataract shovel is provided with sides something like those of a fire shovel. The shovel is made in two sizes. When it is properly used any pressure made on the cornea by the pusher is taken by the shovel in the surgeon's hand and does not fall on the posterior lip of the wound, or on the vitreous.

The iris is then placed in position with scrupulous care, after which a small fold at its base is caught up in very fine forceps and snipped off. This part of the *technique*, the basal iridectomy, must not be confused with that of Elschnig, who merely incises the iris and removes nothing. (*See* THE OPHTHALMOSCOPE for November, 1912.)

Instruments after sterilization lie in 1—1,000 asterol* solution and are used damp.

No dressing is applied to the eye. The lids are left free. A special aluminium cap (*Kapsel*), having slots around it for the insertion of sticking plaster, is placed over the eye and fixed to the skin by the strips of plaster attached to the slits. Other strips of plaster are passed over the cap from brow to cheek.

Cataract patients are, in the ordinary course, kept in bed only for twenty-four hours, and are then allowed to sit in a chair.

Some General Notes.

Glaucoma.—I gathered that glaucoma is comparatively rare in Würzburg. It is a well recognised fact that this disease is peculiarly common among the Hebrew race, affecting the women more particularly. Jews are not numerous in Würzburg.

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* "Asterol" is a double salt: salicylate of mercury and amido-oxyisobutyrate of soda.

In simple glaucoma Hess finds himself less and less inclined to operate. If operation is called for, iridectomy is the procedure of choice.

Tuberculin.—Hess states that although he has seen cases cured under tuberculin treatment, he has never been able to satisfy himself that the cure was definitely due to the tuberculin. In one case a patient who had been under tuberculin treatment for phthisis, lost both eyes from tuberculous irido-cyclitis. Nevertheless he is investigating this method of treatment afresh, after being for a while very dissatisfied with it.

Salvarsan.—Hess agrees that '606' is a wonderful drug in the earlier manifestations of syphilis, but is useless in interstitial keratitis.

CURRENT LITERATURE.

NOTE.—Communications of which the titles only are given either contain nothing new or else do not lend themselves to abstract.

I.—A THEORY OF GLAUCOMA.

Fischer, Martin H.—On the nature, cause, and relief of glaucoma. *Transactions of the American Academy of Ophthalmology and Oto-Laryngology*, 1911.

It is difficult to present within the compass of an abstract of ordinary dimensions a satisfactory *coup d'œil* of the theory of glaucoma which has been worked out by **Martin H. Fischer**, professor of physiology in the University of Cincinnati; a theory which, under the designation of "The Colloid Acidosis Theory," has given rise to a great deal of interest in the United States. It has been considered advisable, in view of the interest aroused by it, to present a rather full synopsis of the article in which Fischer draws together, from the skein of his work on the physiology of the colloids, those threads which have led him to his explanation of glaucoma.

Commencing with remarks upon the unsatisfactory state of our knowledge, and the inconclusive nature of the theories regarding the problem of absorption and secretion of water by a living cell, Fischer proceeds to enquire whether there may be physical or physico-chemical forces capable of influencing the migration of water, forces such as one might imagine to be active in living protoplasm, other than those involved in the two theories which hold the field. These two theories are, the one which looks to the pressure of circulating liquids to explain the phenomena, and other the osmosis theory. The first theory is ruled out by the fact that it does not explain the phenomena occurring in living things which have no pressure circulation, and the second has been badly handicapped by the fact that the actions of alkalis and acids have proved to be what the author calls "most annoying exceptions" to it.

A force which promised from the first to help much towards an explanation of those physiological processes which are connected with a storage or a movement of water (turgor in plants, plasmolytic phenomena in animal and vegetable cells, certain phenomena of growth, œdema, and glaucoma), was the variable affinity of the colloids for water.

Anticipating the author a little, we may now say that his contention is that the cause of glaucoma may well reside in the tissues of the eyeball itself, and that the eye becomes glaucomatous, not because fluid is pressed into it, but because, through changes in itself, it absorbs an increased amount of water.

In order to prove his point that the presence of hydrophylic colloids in a tissue is the main factor in determining the amount of water held by that tissue, Fischer had to proceed by experiment. It was found by himself and Gertrude Moore that the conditions governing the swelling of fibrin are identical with those which govern the swelling of frog's muscle. So also with gelatine and muscle. These experiments have proved conclusively, Fischer says, that the state of the colloids is the chief determining factor in the secretion and absorption of water by the tissues.

A series of experiments on the absorption of water by fibrin is then detailed. These bear strongly on what follows, but must be considerably abbreviated here.

(*a*) Fibrin swells more in any acid than it does in distilled water. The swelling is greater with certain acids than with others. The amount of swelling in any acid solution is dependent on the concentration of the acid.

(*b*) Fibrin swells more in the solution of any alkali than it does in water, the amount of swelling being greater in some alkalis than in others. The amount of swelling is dependent on the concentration of the alkali.

(*c*) Comparison of acid and alkali solutions of the same H. or OH. concentration shows that fibrin swells much less in an acid solution than in an equally concentrated alkali solution.

(*d*) The addition of any salt to the solution of an acid or an alkali decreases the amount that fibrin will swell in that solution ; salts which react with the acids excepted. The higher the concentration of the added salt the less does the fibrin swell, and if enough is added, the effect of the acid or alkali may be suppressed entirely.

(*e*) If the effect of equimolecular salt solutions* is compared, it is found that they affect the swelling of fibrin in solutions of acids or alkalis to a very unequal degree.

(*f*) Non-electrolytes, such as glycerine, urea, and saccharose, even in concentrated solutions, do not alter the swelling caused by acid or alkali.

(*g*) The absorption and secretion of water by fibrin is to a high degree a reversible process. If for a hydrochloric acid solution in which fibrin has attained its maximal swelling an equally concentrated sulphuric acid is substituted, the fibrin shrinks. The same for alkali solutions. So also swollen fibrin in acid solution shrinks rapidly if for the pure acid is substituted one of equal concentration containing a salt. The reverse of all these (and other experiments which are here omitted) can also be accomplished, although not with the same ease.

The author next proceeds to discuss the analogy between the absorption of water by fibrin, and the absorption of water by the eye, with the view of showing that the absorption of water by the eye is determined by the colloids contained in it, and the amount of such absorption by the state in which these colloids find themselves.

The eye represents a collection of tissues which may be utilized as experimental material in the attempt to see if the analogy between the absorption of water by fibrin and the absorption of water by muscle can be broadened to embrace an analogy between the absorption of water by fibrin and the absorption of water by protoplasm in general. From experiments, carried out mainly on sheep's eyes, in the same way as the experiments on fibrin, Fischer reaches the conclusion that the absorption of water by the eye is governed by the same laws as the absorption of water by fibrin. He places the results of the experiments before us under similar headings (a), (b), etc., as in the case of fibrin, so that comparisons can readily be made. The following summary represents the gist of the matter :—

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*A molecular solution is made by dissolving a gram-molecule (the molecular weight of a substance including its water of crystallization, if it has any, expressed in grams) in enough water to make a litre. Solutions that contain the same number of gram-molecules in the unit volume are equimolecular.

(a) An enucleated eye absorbs more water in the solution of any acid than in distilled water. Equinormal acids are equally effective. The amount which an eye swells in any acid solution is dependent on the concentration of the acid. In the highest concentrations the absorption of water is sufficiently great and rapid to cause rupture of the eye. Concentrations of 1/110 normal nitric and hydrochloric acids lead to rupture, while such a low concentration of hydrochloric acid that the acid cannot be recognised as acid by the sense of taste, causes a decided absorption of water beyond that of the control eye in plain water.

(b) Eyes swell more in the solution of an alkali than in pure water. The different alkalis in equinormal solutions affect the swelling to unequal degrees.

(c) May be omitted from this summary.

(d) The presence of any salt in the solution of an acid or an alkali reduces the amount that an eye will swell in that solution. The higher the concentration of the salt the less does the eye swell.

(e) In equimolecular solutions the different salts are very unequally effective in the above respect, and their action is very similar to their action in the case of fibrin.

(f) As in the case of fibrin.

(g) The absorption and secretion of water by the eye is, to a large extent, a reversible process. An eye which has reached the bursting point in a pure hydrochloric acid solution, suffers a prompt loss of water if taken out of this solution and transferred to an equally concentrated one containing calcium chloride in addition to the hydrochloric acid. Reversely, if an eye which has gained but little weight in pure water is transferred to a dilute hydrochloric acid solution, the absorption of water is immediately hastened, and becomes so great that the eye bursts.

The author then passes to the important point as to the nature and cause of glaucoma. As to the nature, it is an œdema. As to the cause of this œdema, after briefly cashiering the ordinary theories, he proceeds as follows, and we here feel obliged to quote almost textually :

"The experiments which we have detailed showed very clearly that the most intense grades of glaucoma can be induced experimentally in an eye in the entire absence of any circulation. This fact, coupled with the well-known observation that an increase of the pressure of the circulating liquids through the eye is not followed by glaucoma, arraigns all explanations of glaucoma which look to an increased pressure as of essential importance in its causation. *We are, at the same time, led to conclude that the cause of glaucoma may well reside in the tissues of the eye itself, and that it becomes glaucomatous, not because fluid is pressed into it, but because, through changes in it, it absorbs an increased amount of water.* That the amount of such absorption is sufficient to explain the severest grades of glaucoma ever observed clinically, is clearly enough evidenced by the fact that, through the mere presence of a little acid, an ox eye can be made to absorb enough water to rupture its enormously thick sclera. This is a grade of glaucoma that exceeds anything that we ever have the opportunity of observing clinically. Our experiments further show that this increased absorption of water by the eye is dependent upon the colloids in the eye, for not only is the eye built up of a series of different colloids (sclera, cornea, lens, vitreous humour), but the same conditions which govern the absorption of water by fibrin also govern the absorption of water by the eye. On the ground of these experiments we can, therefore, no longer insist that the eye becomes glaucomatous because water is forced into it. It does this because chemical changes occur within the eye which increase the affinity of the ocular colloids for water, so that these are enabled to absorb water from any available source. In our experiments with enucleated eyes this source is the solution into which the eye has been dropped ; in the body it is the liquids flowing about or through the eye."

The author is not able to say definitely just what are the chemical changes in glaucoma, but he says that there can be little doubt that the cause of this œdema is in essence the same as that of any of the more generalized œdemas, *e.g.*, carbon di-oxide and such acids as are a constant accompaniment of states of lack of oxygen due to circulatory disturbances. The best evidence, however, in support of the colloidal conception of glaucoma is furnished, not by hypothetical discussions or chemical changes, but by clinical observations on the relief of the disease, as follows :

Bearing in mind that the presence of any salt markedly decreases the amount that an eye will swell in an acid solution, Fischer, along with Hayward G. Thomas, followed out this indication. The salts which do not cause corneal opacities must be chosen. These are the citrate, tartrate, sulphate, and phosphate of sodium and potassium. After experimentation, chemically pure sodium citrate was chosen. It was used in concentration from 1/8 to 1/6 molecular solution,* equivalent to a 4.05 per cent. to a 5.41 per cent. solution of ordinary crystallized sodium citrate. The former has an osmotic pressure below that of the human tissue fluids, the latter one slightly above. We may omit some technical details and come to the conclusions :—

"The use of sub-conjunctival injections (of the above) in clinical cases of glaucoma is entirely harmless and is always followed by a prompt fall in ocular tension. The fall in tension is appreciable within ten minutes after the injection, and may be so great as to make the eye have a subnormal tension. The effect of such a sub-conjunctival injection lasts for from three to six days (or even more) and is accompanied by a relief of all the subjective symptoms of glaucoma," blindness due to structural changes excepted.

It is realised that these effects do not constitute a *cure*. In order to establish a cure, we must remove the conditions which are responsible for the development of substances which increase the affinity of the ocular colloids for water. If these are acids, the product of a circulatory disturbance or of an infection, the real cure resides in a correction of the circulation to the eye, or in the removal of the infection. It is pointed out that the sodium citrate injections help even in this, for they reduce the swelling of the colloids which tend to compress the blood vessels passing into and out of the eye. It is considered that obliteration of the filtration angle is more likely to be the consequence than the cause of glaucoma. This is explained as due to the fact (experimentally proved, the reviewer understands), that the colloids posterior to the lens—the sclera, choroid, and vitreous—swell more than those anterior to the lens. "Through this unevenness the ciliary body is crowded against the sclera—a process in which the blood vessels of the ciliary body become pinched. Such an embarrassment in the circulation (lack of oxygen, accumulation of CO_2 and acids) is then added to whatever conditions are already active in producing the glaucoma."

Systemic treatment is next referred to. We shall omit all detail of the treatment for getting rid of acid from the body system, and "salting" the patient, so as to neutralize the acids, and be content with the statement that in urgent cases, it proceeds on somewhat drastic lines. It is advisable, nevertheless, to repeat what the author says when introducing this subject: "Every effort must be made to discover the various factors that are responsible for the chemical changes (acid production) that lead to the increased swelling of the ocular colloids. It is self-apparent that the accumulation of acid in an eye leads to a swelling of the ocular colloids, no matter whether the origin of this acid is purely local (say the consequence of an arterio-sclerosis of the blood vessels of the eyeball), or whether a glaucomatous attack is precipitated because to this local acid production is added the effects of acids produced elsewhere in the body and carried into the eye through the circulation."

Lastly, Fischer attacks the question of the nature of corneal opacities the result of chemical disturbances in the eye, whether caused from within or without; exclusive of deposits of leucocytes, and so on. What he has to say is confined to the cornea, because corneal opacities have been best studied, but from preliminary experiments, it seems likely that what is said of the cornea holds good for the other transparent media. We may omit the experiments on which the author bases his conclusion, and pass to the conclusion itself:—"Neither the presence of an increased or a decreased amount of fluid in the cornea is responsible for the appearance of an opacity. An opacity is produced whenever some of the colloidal constituents of the cornea are precipitated, and depending upon whether such a precipitation is only slight, or very great, these opacities vary from such as are barely visible (steaminess of the cornea) to such as are intensely white (leukoma)." The question is then raised as to the possibility of the absorption of these opacities, whether they be associated with increase of tension, or not; and whether they be in the cornea or in the other transparent media. Can we regard protein precipitations as reversible? Can we make them go back into "solution"? The answer to this very important question is that there always seems to be *some* degree of reversibility. Two things are important in this question: first, how long has the precipitate endured? Secondly, what is the exact character of the precipitate? If, for example, it has been produced by a heavy metal, it is less reversible than if produced by a lighter one.

These questions as to the solution of opacities by means of subconjunctival injections on the lines indicated in the article are being further investigated by Thomas.

ERNEST THOMSON.

II.—WOUNDS OF THE ORBIT.

(1) **Adam, Curt.—The mechanics and action of transverse wounds of the orbit by projectiles. (Mechanik und Wirkung der orbital Querschussverletzungen.)** *Zeitschrift für Augenheilkunde*, Juli und August, 1911.

(2) **Jarnatowski.—Bullet wound through both orbits. (Orbitale Querschuss-Verletzung.)** *Centralbl. f. prak. Augenheilk.*, Dezember, 1911.

(1) **Curt Adam,** of Berlin, first contrasts the clinical picture seen when the orbit has been penetrated by such an object as a pointed stick from the front with that seen when it has been injured by a shot passing across

it transversely. In the first case it is usual for the ophthalmoscopic lesions to be confined to the optic nerve ; in the second, in addition to changes in the optic nerve, there are lesions of the retina and choroid, even when the eye itself has not been touched by the projectile. The appearances seen after a frontal penetration by a stick vary according to whether the optic nerve has been wounded in its vascular or avascular portions. In the first instance, we have the clinical picture of embolism of the central artery, in the second we find a normal fundus. Here changes appear only after a longer or shorter time, when a descending atrophy of the nerve appears, unaccompanied by vascular alterations.

After a projectile has crossed the orbit, we obtain an entirely different picture.—Small hæmorrhages are present in the vitreous, the retina, and the choroid. The retina may be detached by a subretinal hæmorrhage. After some weeks, a more or less massive formation of connective tissue is observed, especially at the posterior pole, which generally spreads into the vitreous. This typical process has been described by Hirschberg, Goldzieher, Praun, Enslin, Pollack and Liebrecht, and by all in very similar language. The explanations given, however, by these authors vary materially.

Curt Adam shows that the commonly-received hypotheses cannot fully account for the phenomena in all cases. It is not caused by division of the ciliary vessels and nerves, as Goldzieher has suggested. These lesions cause pigment degeneration, but no new formation of connective tissue. It is not caused by direct contusion, nor, as Berlin suggests, does this connective tissue formation proceed from the absorption of hæmorrhages. Curt Adam propounds what he calls a "new theory." All the phenomena can be explained with reference to the "explosive action" of a shot traversing a soft substance enclosed in a rigid case. We believe that we are correct in saying that this very obvious explanation was suggested by E. Nettleship some years ago.

Curt Adam, to prove this theory, has examined several skulls which have suffered from injuries of this nature ; he has experimented, with a schematic eye, upon dogs and upon the cadaver. As the result of these experiments, and upon clinical evidence, he comes to the following conclusions.—(1) The well-known appearances seen in an eye after a transverse wound of the orbit by a projectile which take the form of a chorio-retinitis are the result of several lesions, chief among which are tears of the choroid and retina and hæmorrhages. (2) The last causes are not due to tearing of the ciliary vessels and nerves, but to the explosive action of the shot within the orbit. (3) A complete, or almost complete, closure of the orbit is necessary, for we do not obtain the same results from experiments upon animals such as dogs, which have an open orbit. (4) The experiments upon the human cadaver and upon the schematic orbit prove that this explosive action causes comminution of the bony walls of the orbit, propulsion of the eye, flattening of its posterior pole, and increase of the intraocular pressure. (5) The result of these changes is a chorio-retinitis proliferans associated with excessive cicatrix-formation, pigment over-growth, atrophy, sclerosis of the vessels of the choroid, and other phenomena. (6) In fatal cases of wounds in the temple the changes in the globe are less marked because the projectile takes a more posterior course, and much of its energy is expended upon structures within the skull. In those patients who survive, the reverse is the case.

T. Harrison Butler.

(2) **Jarnatowski**, of Posen, reports a case of a young man, *æt.* 29, who attempted to commit suicide by shooting himself in the right temple, 1 cm. behind the orbital margin. He was seen eight months after the attempt. Both eyes were somewhat proptosed, the right was directed upwards, movements in

other directions were very limited, disc was atrophic and on the temporal side was a well-marked chorio-retinitis proliferans, and the lower-inner quadrant of the retina was pigmented and atrophic. Absolute blindness. The left showed complete ptosis and limitation of movement upwards. Pupil reacted slightly to light, and there was perception of light in the upper part of the field, but no accurate projection. Disc normal, and on the temporal side there was a large choroidal tear. A radiogram showed the bullet lying against the inner aspect of the outer wall of the left orbit.

The direction of the bullet was upwards and backwards. It therefore directly tore across the right optic nerve and most of the inferior rectus, to a less extent the internal and external recti. It then passed across to the left orbit, tore the upper two-thirds of the left optic nerve, and also completely severed the superior rectus and levator palp. sup. Indirectly, by the explosive force of the rapidly moving bullet, there appeared the retinitis proliferans in the right, and the choroidal tear in the left, caused by raised intraocular pressure from external compression. The patient succeeded in committing suicide eighteen months later, but no *post-mortem* examination was allowed. A. LEVY.

III.—PATHOLOGY.

(SIXTH NOTICE.)

(1) **Rönne, Henning.—A case of ulcerous scleritis.** *Ophthalmology*, January, 1911.

(2) **Okuse.—On the anatomy of congenital ectropion of the uvea. (Beiträge zur Anatomie der Ectropion uveæ congenitum.)** *Klin. Monatsbl. f. Augenheilk.*, Februar, 1911.

(3) **Schieck, F.—On the appearance of tuberculous antibodies in the anterior chamber. (Ueber das Auftreten tuberkulöser Antikörper in der vorderen Kammer.)** *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1911.

(4) **Zade, R.—Researches on the significance of phagocytosis in corneal infection. (Untersuchungen ueber die Bedeutung der Phagocytose bei Hornhautinfektionen.)** *Bericht der Ophthalmologischen Gesellschaft*, Heidelberg, 1911.

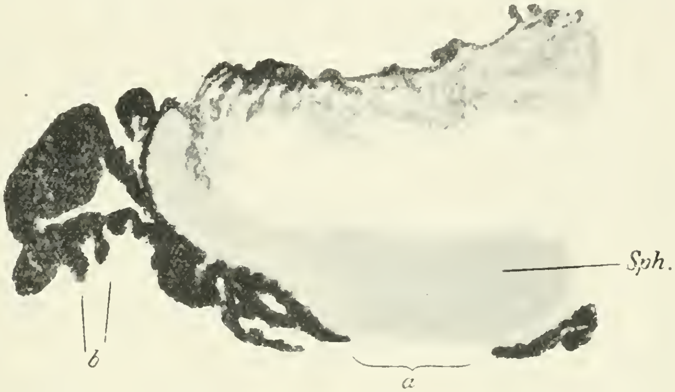
(5) **Oguchi, Ch.—On cystoid degeneration of the retina. (Ueber die cystoide Degeneration der Retina.)** von Graefe's *Archiv f. Ophthalmologie*, 3 Januar, 1912.

(6) **Krauss, W.—On a primary tumour of the optic papilla. (Ueber einen primären Tumor der Opticuspapille.)** *Zeitschrift für Augenheilkunde*, Februar, 1912.

(1) **Rönne**, in the *Klinische Monatsblatter für Augenheilkunde*, März, 1908, communicated a case of scleritis with ulceration, and in this article describes a second case. Six weeks after the patient's first visit, the scleritic patch was seen to contain a number of yellow nodes, some of which were ulcerated. Each ulcer had a necrotic base, staining with fluorescein. A portion was removed and examined microscopically. The mucosa showed dilatation of vessels, and perivascular and subepithelial cellular infiltration. The node

itself was composed of a dense cluster of cells, fixed cells, lymphocytes, and plasma cells, and presented also a small necrotic spot. The characteristics which exclude tuberculosis from the diagnosis are, the absence of typical tuberculous structure, bilaterality, tendency to heal, recurrences always occupying a different spot on the circumference, healing with slate-coloured scars, the absence of tubercle bacilli, and negative results of inoculations into the anterior chamber of the rabbit. The author regards the case as probably "rheumatic." A. J. BALLANTYNE.

(2) **Okuse,** of Japan, describes the pathological appearances of congenital ectropion of the uvea, as studied in a piece of iris which showed the anomaly removed for other purposes by the operation of iridectomy. The uveal pigment layer was unusually thick, and showed irregularities in its appearance, especially towards the pupillary edge. At the free edge of the pupil it expanded into a mass, which enclosed a cavity of a more or less triangular shape, traced by Okuse to a persistence of the sinus annularis (v. Szili). The uveal layer extended anterior to the little growth just described, and formed a small club-like pigmented swelling at the edge of the pupil. The iris tissue itself was markedly pigmented, particularly in the anterior boundary layer, and, finally, the sphincter iridis, the free edge of which was uncinate, was much thicker and broader than usual. SYDNEY STEPHENSON.



(3) After examining fifty-nine rabbits with severe experimental tuberculosis of the iris, **Schieck**, of Göttingen, failed to find any evidence of tuberculous antibodies in the aqueous in thirty-nine of them. Ten of the remaining rabbits had been immunised either with dead bacilli or with "sensitized bacillary emulsion" (Hoechst); so that their serum contained a high percentage of tuberculous antibodies. In these animals the antibodies could be detected in the serum. They were present in the sound eye equally with the tuberculous eye, and obviously were derived from the serum. In only one animal, which had not been specifically immunised, could antibodies be detected in the aqueous; but in this case they were also to be found in the serum. The attempt to utilise the aqueous as antigen failed in the eight cases in which the experiment was tried. T. HARRISON BUTLER.

(4) **Zade**, of Heidelberg, has studied the question of the presence of opsonines in the cornea of the rabbit. He adopted Wright's *technique*, and obtained similar results to those published by zur Nedden. The normal cornea of the rabbit contains opsonines for a virulent staphyloccocci and pneumococci, but not for dysentery bacilli and diplobacilli. These opsonines were not in any way modified by immunisation. Infection of the cornea had no influence

whatever upon them, nor was any alteration discovered after the lapse of an infection. On the other hand, paracentesis, as zur Nedden had already shown, caused a great increase, which was not influenced by infection. Frequent puncture produced opsonines for dysentery bacilli. Frequent subconjunctival injections of normal saline had a similar action. The action of solid dionine sufficed to produce opsonines in the dog's cornea, which normally has none. Frequent puncture caused precipitine to appear in the cornea.

T. HARRISON BUTLER.

(5) **Oguchi,** of Tokio, describes a case where crystoid degeneration followed traumatic uveitis. This complication seems to be due to the action of toxine which affects more especially the delicate tissue in the outer nuclear zone round the macula. The process is closely related to retinal detachment. A different kind of cystoid degeneration seems to be due to simple atrophy of the nuclear elements ; this form is usually met with in the region of the ora serrata, and is mostly confined to the inner nuclear zone.

R. GRUBER.

(6) **Krauss,** of Marburg, describes a case of tumour of the optic disc in a man aged twenty-six years. The chief value of the communication is, as the author himself states, the coloured plate of the fundus, which should be of great help to anyone meeting with a similar case. The eye was removed at Göttingen and the tumour held by Schieck to be a perithelioma, but Krauss, who saw some sections, considers that it is a vascular sarcoma. T. HARRISON BUTLER.

IV.—MUSCLE EXERCISES.

Duane, Alexander (New York).—Directions for muscle exercises. *Ophthalmic Record*, June, 1911.

Duane's appliances for muscle exercises consist of :—

1. Square unmounted prisms of 10°, 16°, and 20°.
2. A round white pasteboard target, at least one foot in diameter, with a central black bull's eye, one-third of an inch in diameter.
3. A round white pasteboard target, six inches in diameter, with a dot in the centre, not more than $\frac{1}{32}$ of an inch in diameter, and (for use in cases of much hyperphoria) a narrow vertical line, an inch long, in the middle of the other side.

Each practice consists of the following exercises :—

(*a*) Converging with prisms when the eyes are fixed on distance.
(*b*) Converging with prisms when the eyes are fixed on a near object.
(*c*) Diverging with prisms.
(*d*) Converging on an approximating point.

In doing exercises (*a*) and (*b*) the prisms should be placed first before one eye, then before the other alternately, beginning with weak combinations and working up to stronger ones, and starting from this and working up still higher next day. As a general rule, four or five weeks are required to produce the best results in convergence insufficiency, and the patient should be able to overcome prisms base out of an aggregate amount of at least 46°. In spasm of accommodation and convergence excess, exercise (*c*) should be used, and (*a*) and (*b*) avoided ; 20° should be overcome at reading distance. Other detailed instructions are added for special cases, and printed instructions are given to the patient as to the order, duration, and frequency of the exercises.

J. JAMESON EVANS.

V.—ALBUMINURIC RETINITIS.

Rochon-Duvigneaud.—Albuminuric retinitis. (Rétinite albuminurique.) *Bull. et Mém. de la Société Française d'Ophtalmologie*, 1912.

The first 239 pages of the recently issued *Bulletins* of the French Ophthalmological Society are occupied by an account of the discussion on albuminuric retinitis held during the last meeting of the Society (May, 1912). All but thirty of those pages are devoted to Rochon-Duvigneaud's opening address on the subject, and the remainder to contributions to the discussion by Terson, Chauffard, Mawas, Terrien, Sous, Nuël, Morax, and Wicherkiewicz, together with Rochon-Duvigneaud's reply.

Rochon-Duvigneaud, of Paris, as hinted, has written a veritable treatise upon the theme entrusted to him. He divides his subject into two parts:—1, the retinitis of pregnancy, and 2, ordinary albuminuric retinitis, and justifies the distinction on the ground that the former is simpler to observe from beginning to end than the latter.

1. The Retinitis of Pregnancy.

As instances of gravidic retinitis, Rochon-Duvigneaud includes those cases alone of which pregnancy is the cause. Under the same head he considers cases of gravidic optic neuritis, inasmuch as the ætiology and evolution of the last-named do not differ from those of retinitis.

The retinitis of pregnancy is a rare affection. For example, at the Lariboisière Hospital, Paris, one case of retinitis was found in 3,700 pregnancies; and Silex discovered a single instance of the disease among 3,000 pregnant women. The condition is more common in primiparæ than in multiparæ. Seven-tenths of the cases appear during the last four months of pregnancy (Burnier). In the common run of cases, a female, who has usually reached the sixth month of pregnancy, notices a progressive failure of sight, and when examined with the ophthalmoscope, is found to show the classic lesions of retinitis. Œdema is often present, and she suffers from intense headache and nausea, with or without vomiting. Her urine, although often normal or super-normal in amount, contains more or less albumin. If treatment be not speedily instituted, the condition becomes worse, the urine diminishes in quantity, and eclampsia supervenes. The condition is one of true gravidic retinitis determined by a toxæmia, which although in most cases fugacious, may on occasion be very serious and lead to a progressive degeneration of the kidney. This nephritis is believed by Rochon-Duvigneaud to be the actual cause of the retinitis.

The defects in sight caused by the retinal lesions are often complicated with eclamptic amaurosis. Among 154 cases of gravidic retinitis, Rochon-Duvigneaud noted eclamptic amaurosis in 17—that is, in upwards of 10 per cent. The retinal lesions may not be found until after a woman has been blinded by an eclamptic crisis, but that may simply mean that the changes, although present prior to the amaurosis, had not been looked for. The author raises a philosophic doubt as to whether the distinction between amaurosis with and without retinal lesions is so absolute as we are sometimes led to believe. A sudden toxic saturation of the optic nerve and retina may determine an amaurosis without retinal changes only because such changes have not yet had time to develop. This suggestion agrees well with cases of uræmic amaurosis followed by optic atrophy, of which examples are by no means rare in ophthalmic literature.

In 24 cases of gravidic amaurosis, without lesions of the fundus oculi, the reaction of the pupil to light was retained in 13 (three-fifths) and lost, or much reduced, in 11 cases (two-fifths). The retention of the photomotor reflex is a sign of relatively good omen as regards the outcome of the case.

On the other hand, in gravidic retinitis the activity of the pupil to light is always more or less retained.

Detachment of the retina, which constitutes a complication of retinitis, appears to be more common in gravidic than in ordinary albuminuric retinitis. Of the 28 such cases collected by Burnier, detachment was bilateral in 18. In one case merely small elevations in the macular region were present, but in all the others there was massive detachment, sometimes involving the whole retina, the upper portion of which was more or less folded, while the lower portion was raised, and even distended, so as to resemble a tumour. The detachment often existed only in the lower part, with an extension in this or that direction. The condition, in general, lasted but a short time, disappearing within a week or a fortnight after delivery. Pigmented cicatrices often remained to mark the site of a former detachment. Vascular scleroses and decolouration of the papilla may follow detachment, as they may other forms of severe retinitis.

The sight in cases of gravidic retinitis usually remains stationary or continues to fail until such time as the child is delivered, unless it possibly be in cases where the fœtus dies. In fact, delivery puts a term to the retinitis, as it does to the other manifestations of the toxæmia of pregnancy. In rare cases, however, after birth, the defective sight, due to an existing retinitis, may become worse, as in cases related respectively by Rochon-Duvigneaud and Cirincione and Schreiber, but, more frequently, such failure of sight is due to actual post-partum retinitis, cases of which by Ingalls, Lutz, and Monthus are adduced by the author.

The natural evolution of the retinitis of pregnancy is towards cure, absolute or relative, as soon as the cause of the mischief in the shape of gravidic nephritis comes to an end, and it is unusual for this species of nephritis to persist. Some striking figures adduced by Rochon-Duvigneaud go to show that prolongation of pregnancy to its normal term is fraught with grave danger to the life of a woman affected with the retinitis of pregnancy (15 per cent. of deaths); that spontaneous delivery before term is crowned with relative success (11 per cent. of deaths); and, finally, that artificial delivery prior to term has reduced the mortality to 4 per cent. These figures give a clear indication as to obstetrical treatment of retinitis.

Curiously enough, the prognosis *quoad* sight runs exactly parallel with the foregoing. It is gravest when pregnancy goes to term. It improves with natural premature delivery. And it is best of all when toxæmia is cut short by the induction of artificial labour. Of 130 patients who escaped both death and blindness, 34 (26.153 per cent.) belonged to the first of the above groups, 26 (20 per cent.) to the second, and 61 (46.923 per cent.) to the third, while to complete the list it should be said that in 9 (6.923 per cent.) the facts were unknown.

No statement can be made as to the exact amount of sight regained by the patients, owing to absence of the *data* necessary for forming a judgment on the point. But it is clear that in many of the cases vision has remained more or less defective, sometimes seriously so. The prognosis of the retinitis of pregnancy as regards sight is therefore far from being as favourable as is sometimes thought.

There are few reports which deal with the pathology of the retinitis of pregnancy. Indeed, only a couple of detailed examinations are on record, namely, those of Cirincione and Lauber and Adamük, both of which are quoted at some length by Rochon-Duvigneaud. The retinal lesions appear to be identical with those of ordinary albuminuric retinitis. Sero-fibrinous exudations and gangliform degeneration of the nerve-fibres dominate the pathologic picture, while the state of the retinal vessels varies according to the case.

Rochon-Duvigneaud protests against the notion (so widely spread in Germany) that the vascular lesions, found in certain cases, form the sole starting-point of the various alterations in the retina. That theory, in his view, fails to explain the origin of the retinitis. In conjunction with Opin,* he has found that generalised arterio-sclerosis is not the rule in patients affected with nephritic retinitis. There must be some other factor or factors at work.

The vessels and the tissues suffer simultaneously from the influence of some noxious agent, which may assuredly travel by the vessels and in that way may harm them first, but which also penetrates the retina, and sets up in that delicate structure the changes peculiar to this form of retinitis, very different from those determined by simple ischæmia or escape of blood. Although a microbial cause cannot be eliminated, yet the foregoing considerations render a humoral alteration the most likely hypothesis. This is dependent upon nephritis, and is disseminated by the blood-stream, and finds in the retina the particular conditions favourable for its fixation and effect. The retina is a very vulnerable structure, and its terminal arterial system, together with its slackness of circulation, render it particularly susceptible to the action of poisons competent to act upon its tissues. If, as we know, strychnine may become fixed in the cells of the anterior cornua of the spinal cord, and if in certain cases diphtheria toxin impregnates only the cells of the bulbar nuclei to the exclusion of other parts of the nervous system, there is no reason why the retina should not present a special affinity for this or that substance harmful to it. It may be, indeed, the only tissue susceptible of certain chemical reactions. This agrees with the fact that in fatal cases of nephritis and retinitis, three organs alone were found by the author and Opin to be diseased, *viz.*, the heart, the kidney, and the retina, all the others being apparently healthy. Leaving aside the heart, the hypertrophy of which is of mechanical production, we may therefore say that in these cases the retina alone betrays in an obvious way signs of a pathogenic influence. The explanation of the problem, however, is probably to be sought, not in simple histological study of the parts but in histo-chemical researches, in physiological experiment, or in chemical studies, properly so-called. Unfortunately, the smallness of the retina, together with the difficulty of procuring diseased retinæ, renders such methods of investigation very difficult.

In discussing the prophylaxis of "*Eclampsisme*," Rochon-Duvigneaud urges the necessity of ophthalmoscopic examination in every woman who presents signs, no matter how trivial, of gravidic intoxication, and he enters a plea for the provision of a dark-room attached to every maternity hospital. It has already been shown that to allow pregnancy to go to term is to subject a woman with gravidic retinitis to the maximum of danger as regards both sight and life. The artificial induction of labour is therefore the best way to treat the case. But it must not be forgotten, as Rochon-Duvigneaud reminds us, that the consequences of the retinitis, even when arrested in its development, may be very serious. He unconditionally advises the induction of labour as soon as the retinitis is discovered. It is not justifiable, he thinks, to subject the mother to any risks in order to retain a fœtus which four times

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**See* THE OPHTHALMOSCOPE, 1904, p, 320.

out of five dies *in utero* or succumbs a few days after birth. There remains the further important question of future pregnancies in these cases. In general, such should be advised against. At all events, an interval of two years should be allowed to elapse before the organism of a woman can be considered as having recovered a sufficient degree of resistance. The total disappearance of albumen from the urine, a perfectly normal blood-pressure, good general health, renewed resistance against fatigue, possibly the test of renal permeability to sodium chloride, and in every case the possibility of returning to a normal dietary without the reappearance of albumen in the water should afford the best guarantee of a return to normal conditions. In the event of a fresh pregnancy, even under these seemingly favourable conditions, the woman, in spite of everything, should be carefully watched from the beginning.

(*To be concluded.*)

SYDNEY STEPHENSON.

VI.—THE SURGICAL TREATMENT OF STRABISMUS.

(1) **Bielschowsky, Alfred.—Exceptional causes of failure in the operative treatment of strabismus.** *Archives of Ophthalmology*, March, 1911.

(2) **Duane, Alexander.—The indications for operation in heterophoria and squint.** *Archives of Ophthalmology*, May and July, 1911.

(3) **Denig, R.—Anchorage of the suture within the limbus corneæ in advancement. (Verankerung der Naht im Limbus der Hornhaut bei der Vorlagerung.)** von Graefe's *Archiv f. Ophthalmologie*, Bd. LXXX, Heft i, September 26, 1911.

(4) **O'Connor, R. P.—Partial tenotomy.** *Ophthalmology*, October, 1911.

(5) **Kuhnt, H.—On a simple method of regulating the action of tenotomy. (Ueber ein einfaches Verfahren die Wirkung der Tenotomie zu dosieren.)** *Zeitschrift für Augenheilkunde*, Januar, 1912.

(6) **Suffa, George A.—A further communication on my ocular muscle-tucking or shortening operation.** *Archives of Ophthalmology*, May, 1912.

(7) **Campbell, E. Kenneth and Alexander, G. F.—The operative treatment of concomitant strabismus.** *Lancet*, June 1, 1912.

(8) **Elschnig, A.—The technique of advancement of the ocular muscles. (Zur Technik der Augenmuskelvorlagerung.)** *Klin. Monatsbl. f. Augenheilkunde*, Juli, 1912.

(9) **Harman, N. Bishop.—A new operation for squint: subconjunctival reefing and advancement.** *Trans. Ophth. Society U.K.*, 1912, Fasc. 3., p. 246.

(1) From a consideration of failures in operations for strabismus, **Bielschowsky,** has been led to attach greater importance to abnormal innervation of the eye muscles dependent on physical or psychic conditions. In ordinary typical strabismus, either the permanent or the periodic, there are generally no subjective symptoms, and this fact should lead us, when

symptoms are present, not to attribute them entirely or even primarily to the muscular anomaly, but to search for neuropathic disturbances. Bielschowsky gives accounts of several cases which illustrate this view. He warns us against too hurried operations; and thinks that operative measures should never be undertaken after one examination only, because subsequent examinations often reveal a dissociated character of the anomaly, inconstancy of the angle, or the dependence of the anomaly on physical or psychic conditions.
ROSA FORD.

(2) **Duane**, of New York, considers this subject so minutely that it is necessary for those who are specially interested to read the whole paper. He deals with the symptoms demanding operation, pointing out that diplopia may not be abolished perhaps by an operation, and yet, because it has been made concomitant, the confusion and discomfort from which the patient has suffered may be markedly relieved and that very slight diplopia may reveal itself only by the asthenopia which develops at once when the patient attempts to read; with the diagnostic points to be considered before operation, Duane believing that it is important for success to be clear of the exact nature of the muscle defect; with the prognostic points to be considered before operation, drawing attention to the fact that a slight diplopia often occurs after operation, which is temporary and rather to be desired, as showing that the operation has been carried far enough; and to the dangers of re-operation, so great that Duane will never operate a second time if it can be avoided; with the time to operate; and, finally, with the method of operation, which largely depends on the exact pathological condition to be dealt with.
ROSA FORD.

(3) **Denig** thinks that in muscular advancement the suture must be well embedded within the scleral tissue; this can, as a rule, be effected only by perforating the sclera. This hardly ever causes any untoward symptoms, still the neighbourhood of the uveal region is rather dangerous, and so Denig advises the insertion of the suture through the limbus and into the anterior chamber. Careful and trustworthy fixation by an assistant is essential. The conjunctiva is detached and the needle slantingly introduced from a point about 2 mm. above the horizontal meridian, until its point appears in the anterior chamber, and then in the same way out again to a point 2 mm. below the meridian. In this way there is no leakage of aqueous humour, and the thread lies quite in the most peripheral corner of the chamber. The operation then proceeds in the usual way. The suture should remain for at least one week, or, better still, for ten or fourteen days. Denig has performed the operation in thirty-four cases without any disagreeable consequences.
R. GRUBER.

(4) **O'Connor's** operation consists in making two lateral, and one central, incision, across the muscle near its insertion. The gaping of these incisions allows of the elongation of the muscle. The procedure has given satisfactory results in the few cases in which the author has tried it. A. J. BALLANTYNE.

(5) **Kuhnt**, of Bonn, describes a new and simple method of regulating the action of a tenotomy.

The effect of a tenotomy may, he points out, be very varied. In some cases little or no effect is produced; in others, in many, after a longer or shorter interval, the effect becomes too great, and it may happen that the tenotomised muscle loses its power altogether. To avoid these ill effects, Stephenson, Verhoef, Kuhnt, Gonin, and others have devised partial tenotomies, or plastic operations upon the tendon, which are intended to lengthen it without separating it from the sclera. These operations are not only complicated and difficult to perform without general anæsthesia, but they often fail to produce the desired effect, because the lengthened tendon is apt to contract vicarious attachments to the sclera.

Kuhnt generally avoids tenotomy, preferring the more rational advancement of the agonist, but he realises that in some cases a tenotomy is indicated, either alone or combined with an advancement. He has, therefore, devised the following method of operating.—The muscle is isolated, and under it is passed a squint hook, which has a groove in the hook like that in a grooved probe. A double-armed suture of catgut is passed through the tendon just over this groove, the needle passing into the groove. The tendon is now separated from the sclera and allowed to retract. The two needles are threaded through the insertion, and knotted so that just sufficient slack is left to give the necessary effect. Kuhnt has a millimetre scale cut in the blades of his scissors, and allows 1 millimetre of lengthening for each 5° of correction necessary. T. HARRISON BUTLER.

(6) **Suffa** has improved his operation by using three new instruments, by combining the myometer and clamp, and by various modifications in procedure. These latter are included in the following summary of his conclusions. —I. In tucking an ocular muscle (1) care should be taken to preserve its capsular covering; (2) the angle of the tendinous insertion of the muscle should be noted and the tucking suture put in parallel to it by means of the myometer so that there shall be no torsion when the suture is tied; (3) the holding ends of the suture should be firmly anchored in the tissues; (4) one mm. of tucking is to be done for each four-prism degrees of error; (5) the suture should be tied with consideration for the circulation and with a square knot. II. For the correction of outward deviations (1) the external rectus should be tenotomised before the tucking suture in the internus is tied; (2) the displacements of the externus should be exactly the same number of millimetres that the internus is shortened (it may be necessary to modify this rule in very large tuckings); (3) the displaced tendon of the externus should be anchored in its new position by a suture until healing has taken place. III. For the correction of inward deviations (1) the internal rectus is not to be tenotomised under any circumstances; (2) in order to aid the tucked externus and give the internus a "breaking-in," the internus should be stretched. IV. Measurements of the ocular tendons with the tenometer for the purpose of getting accurate data, (1) in tucking operations measurements are to be made after the muscle has been stripped ready for the myometer; (2) in tenotomy just before the tendon is severed. V. Diagrammatic illustrations show the (1) mechanical disadvantages of the internal recti muscles; (2) mechanical advantages of the external recti muscles. VI. The external rectus has remarkable recuperative powers, while the internal rectus, *per contra*, relaxes, as shown by observations of operated cases. VII. Operators should co-operate in getting data in order to establish definite rules for operating on the ocular muscles. ROSA FORD.

(7) **Campbell** and **Alexander**, of London, have deduced by calculation that the usual rule that one obtains five degrees of rotation for every millimetre of advancement is erroneous, and that really one obtains only 2.5 degrees. "As the tendon insertion of the external rectus is 5 mm., and that of the external rectus 7 mm. from the corneal margin, 4 and 6 mm. may be taken as the extent to which we can advance their muscular insertions without resection; hence the maximum rotation we can thereby obtain is 10 and 15 degrees respectively. As the length of the tendon of the internal rectus is 3 mm. and that of the external rectus 7 mm., and as for the sutures to hold they must grip the tendon fibres, the maximum rotation we can obtain by resection with attachment of the new tendon insertion to its old site is for the former 5 degrees and for the latter 15 degrees while from advancement to

the edge of the cornea combined with resection the maximum rotation we can obtain is for the former 15 degrees and for the latter 30 degrees."

The authors proceed to point out that a serious objection to tenotomy is that when effective, it is followed by limitation in the rotation of the globe in the direction of the action of the muscle, whereby concomitancy is lost and diplopia produced when an object is carried sufficiently far in this direction. Rational treatment lies in conferring on both the external recti an increased traction corresponding to that which has been acquired by the internal recti through exalted innervation. Campbell and Alexander are in favour of advancing the external rectus of one eye to the extent sufficient to correct half the degree, and, preferably after four or six weeks, advancing that of the other to the extent requisite to obtain a slight primary over-correction. Tenotomy should only be done in cases of a degree beyond the power of the double advancement. It should be done first, since its effects are variable, and the advancement should follow after four or six weeks. It should be done on the less serviceable eye and will rarely be required on both. Finally, the authors describe their usual method of advancement, which may with advantage be read in the original article. ERNEST THOMSON.

(8) Many modifications of the advancement operation have been introduced with the object of securing trustworthy fixation of the muscle at its new point of attachment. The procedure adopted by **Elschnig**, of Prague, is as follows.—A double-armed suture is passed through the muscle and draws it forward and fixes it near the corneal margin. A second suture is then inserted a few millimetres above the summit of the cornea, passed through conjunctiva, capsule of Tenon, and the tendon of insertion of the superior rectus muscle, then brought downwards and outwards to the upper margin of the muscle, passed once through this, carried back and out at a point 5 mm. above its point of entrance. A third suture is placed below in a similiar manner, and these two extra sutures serve to fix the muscle firmly in its new situation. Elschnig does not make a large resection of the tendon, and he disturbs as little as possible the relations of the muscle and the capsule, so that only the end of the muscle will become fastened to the tissues near the corneo-scleral margin. He quite rightly points out that if we expose the whole muscle, and scarify the episclera and the muscle itself, so as to produce a broad surface of adhesion between the structures, we limit the contractility of the muscle and the mechanical advantage at which it works. He adds that he thinks the antipathy to the performance of tenotomy has been carried too far. A. J. BALLANTYNE.

(9) This communication describes in detail a new operation for shortening a rectus muscle, and gives a table of the results of the operation as performed in thirty cases, in which, for the most part, one muscle alone was touched. Since writing that paper, the number of cases operated upon has passed sixty, the total for one year, and with added experience, certain points of simplicity of *technique* have been seen. In several later cases the shortening of one rectus has been combined with the lengthening of its antagonist, and an account of the method adopted will be published later in THE OPHTHALMOSCOPE.

One advantage of the new operation of "subconjunctival reefing" is manifest, in that of the whole sixty, all except six (cases operated on at Oxford, Dublin, Liverpool, and elsewhere) were treated as outdoor patients and sent home immediately after operation. The success of the method may be gauged by the figures given in the paper referred to, and my later cases are doing rather better than the earlier.

Reefing Advancement.

In this operation the tendon is not cut ; neither is it exposed to view. The upper and lower edges of the tendon to be shortened are cleared by two buttonholes cut through conjunctiva and Tenon's capsule, then special forceps are passed through the buttonholes to secure the tendon, and a movement of the forceps folds or "reefs" the tendon, very much in the fashion that the laundry maid treats linen frills in goffering. The reef is then sewn up or advanced as the case indicates.

The operation is variable with the degree of squint.—(a) For squint up to 15° reefing only may be done, the reef is graded by the set of the blades of the reefing forceps ; in adults each millimetre of shortening will secure about 2.5° rectification, in children about 2°. (b) In high degrees of squint an 8 mm. to 12 mm. reef is made and secured by sutures, then drawn forwards towards the cornea and fixed tightly to the globe by inserting the sutures into the sclero-corneal margin before tying them.

Instruments, etc.—Reefing forceps (Fig. 1), tendon rasp (Fig. 2), scissors, fine toothed forceps (straight Graefe iris forceps are best), a good needle holder, three No. 4 curved needles threaded with doubled No. 1 silk, 6 inches long (one black silk, two white), and two pieces of strapping, 1½ by ½ inch long.

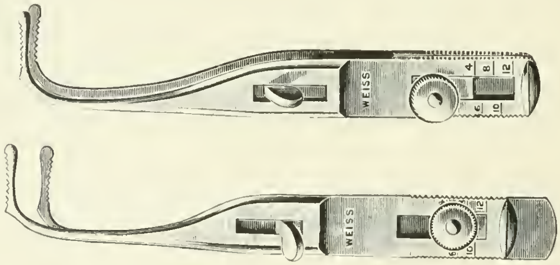

FIG. 1. THE REEFING FORCEPS.—The scale on the handle behind the milled nut indicates in millimetres the shortening secured according to the set of blades. The top figure shows blades set to reef 4 mm. ; the bottom figure shows blades set to reef 12 mm.

Stages of the operation (say, on the external rectus for convergent squint) :

1. *Secure the eye* by means of an anchor suture fixed into the sclera close to the limbus. This avoids further use of fixation forceps and the suture is used to anchor the eye in abduction at the end of the operation. The suture is held over the nose by an assistant (Fig. 3*a*) for the next step.

2. *Locate the tendon.*—When the eye is adducted and the lids are parted, the site of the tendon is seen as a horizontal bluish band, whilst the conjunctiva above and below has a creamy tint. These colour differences are well seen in children.

3. *Cut two button holes* through the conjunctiva and capsule right down to the sclera, above and below and parallel to the edges of the tendon and midway between insertion and canthus, *i.e.*, about 3 mm. from the canthus (Fig. 3*b*).

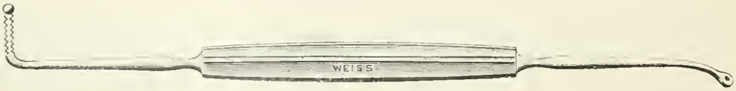

FIG. 2. TENDON RASP.—A squint hook, the upper and lower edges of which are cut in teeth. (At the other extremity is a prong pierced with a hole wherewith to give counter-pressure in passing the needle to sew up the reef ; it also will draw through the needle.)

4. *Pass the tendon rasp* beneath the tendon, free it, then scrape the upper and lower surfaces of the tendon with the rasp to freshen them. The tendon will be seen to go red under the conjunctiva.

5. *Apply the reefing forceps.*—Hold the handle over the external canthus (Fig. 3F), pass the lower hook beneath the tendon, then lift the conjunctiva over the upper hook. Lock the blades. Then slowly turn the forceps from the outer canthus across the eye until the handle comes to rest on the nose (Fig. 3F^1). The tendon is reefed.

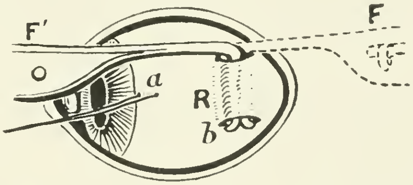

Fig. 3.—Stages 1 to 5 complete.—(*a*) Anchor suture ; (*b*) the lower of the two buttonholes through conjunctiva and capsule parallel to the edges of the tendon ; (*F*) position of reefing forceps on insertion ; (F^1) position of forceps after turning on to nose to make reef ; (*R*) position of reef under conjunctiva.

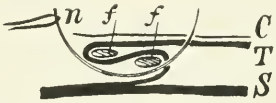

Fig. 4.—Section to show track of needle.—Reef held by (*f. f.*) blades of reefing forceps ; (*n*) needle passing through base of reef ; (*C*) conjunctiva ; (*T*) tendon ; (*S*) sclera.

6. *Sew up the base of the reef.*—Lift the forceps, pass the needle into the opening of the conjunctiva, dip it below the hooks of the forceps and bring it out through the tendon and conjunctiva towards the outer canthus (Fig. 4) pass the suture once again in exactly the same fashion ; draw the silk tight and the reef is gripped at one edge in the bight of the silk. Secure the other edge similarly. Loosen the clamps of the forceps and remove them. If reefing only is to be done for a low degree of squint, thread a small glass bead on each suture and tie in a surgeon's knot. *Advancement.*—If more than 15° is required, insert each suture into the sclera close to the cornea. Thus: take hold of the anchor suture, hold it parallel to the vertical meridian, then

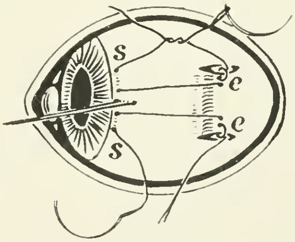

Fig. 5. Stitches in position for reefing advancement.—(*ee*) Mark base of reef secured in bights of sutures on each side (when reefing only sutures are tied here) ; (*ss*) sutures fixed in the sclera ready for tying to advance the reef.

pass the needle of each reef suture from the anchor stitch through the conjunctiva and upper layers of sclera; insert close to and parallel with the limbus, one above the anchor and one below. Tie each suture in the first turn of a surgeon's knot, draw as tight as desired, and complete the knot (Fig. 5). Cut the excess silk away, but leave 5 mm. free ends. The sutures lie wholly outside the conjunctiva, except where they dip down to grip the sclera and to secure the reef.

7. *Finally abduct the eye* by means of the anchor suture. Tie this on to a piece of strapping placed at right angles to the canthus, then secure the ends with another piece of strapping set T-fashion over all. The anchor stitch relaxes the antagonist of the operated muscle and protects the reef from too early strain.

8. Bandage the eye. If spectacles are worn, fix with strapping a piece of card over the outer half of the lens of the open eye and along the bow; this blinker compels the patient to look towards the operated muscle and further relieves the strain on the anchor.

The patient may be allowed out of doors at once. Wash and dress the operated eye daily, remove the anchor stitch on the third day, and the reefing sutures on the tenth day. The rucking of the conjunctiva and the lump caused by the reef smooths out in about six weeks and the scar regresses rapidly.

Comments on Technique.

Stage 1. The anchor stitch.—Fixing this suture takes more pains than any part of the operation. The direction of its insertion will differ as reefing-advancement or reefing alone is done. If reefing only is to be done, the anchor becomes more important, so it is set in the sclera parallel to the limbus and across the axis of the tendon. To fix this easily, it is well to insert the suture into the limbus parallel to the tendon but a little away from the proposed site of the real anchor, draw this suture through, nearly to the end, and hold both parts of the silk in the fingers, so as to keep the globe steady; then the anchor can be fixed with ease and certainty.

Stage 3. Cutting the button holes.—(a) The site is important. The holes should be cut well back from the insertion; if they are so far forward as to reach the insertion, the reefing is difficult. (b) A *fat* fold of conjunctiva should be taken up preferably in Graefe's straight iris forceps and cut right through at one snip; then in most cases the sclera will be seen bared and shining at the bottom of the hole.

Stage 4. Rasping the tendon.—Incredible as it may sound, this causes no pain, even when it is done vigorously. In scraping the deep surface, one finger is pressed on the conjunctiva to support the tendon. When the upper surface has been rasped, it is well to push the rasp through from one buttonhole to the other just under the conjunctiva. The end of the rasp will be found covered in a tent-like fold of Tenon's capsule; this should be seized and cut off, and then the reefing forceps pass cleanly.

Stage 5. Inserting the Reefing Forceps.—It may seem difficult to pass the two blades one above and one below the tendon and withal under the conjunctiva; so I found it at first, but a little manœuvre makes it easy. Pass the lower hook right under the tendon just as if it were a squint hook, then slightly withdraw it, and lift the conjunctiva with the toothed forceps, pull it over the top blade, then push the forceps home until the ends appear in the other button hole. If Tenon's capsule has been well pulled out and cut off in the previous step, the points will come out cleanly.

Stage 6. Sewing up the Reef.—This seems complicated until the process has been watched. If one's attention is fixed upon slipping the needle clear under both hooks of the forceps, the procedure becomes automatic; this done and the forceps dropped back on the nose, the point of the needle will be seen sticking up through the tendon and lifting the conjunctiva. If the needle be pushed out without counter-pressure on the tendon the patient feels pain. Counter-pressure can be applied by the prong pierced with a hole to be seen at the end of the tendon rasp (Fig. 2). When the needle has passed into the hole of the prong a short distance, a dexterous twist of the instrument will draw out the needle.

Needles and Sutures.—Doubled silk holds much better than single; experimental data are given in the original paper. To keep the ends neat, it is well to knot them. Calyx-eyed needles are a boon, particularly if a needle breaks during the operation, for its eye can be broken away and a new needle fixed on to the silk. Removing the sutures when they are no longer wanted, requires a little more care than for other operations, for the reef is held with extraordinary security by the bight of the silk, so care and patience are needed to remove them. Full 5 mm. free ends should be left, so that they may be seen easily: they usually get tucked beneath the external canthus. To remove them, pick up the free ends and pull taut, the two sides below the knot should be seen drawn up, and one cut; the pull should be steadily maintained and the buried length will slowly curl out. If it be so tight that it will not come easily, it may be left for a few days to loosen. I have had to do this only once, and then the silk was found to have a kink in it which prevented it drawing through.

"*The Lump.*"—Almost everyone who has seen or asked me about this operation has expressed the fear that an unsightly permanent "lump" would be left. No lump remains. There is, of course, the rucking and humping of the conjunctiva immediately after the operation, but after six weeks or two months, it is not possible to tell what has been the exact form of operation. Further, since the field of the operation is for the most part well away from the cornea, the permanent scarring is hidden behind the external canthus and less noticeable than an ordinary open advancement operation.

Combined operations.—In no case has reefing advancement of a rectus been performed with tenotomy of the antagonist at one and the same time. I do not think such a procedure justifiable; the separation of the sundered ends of the tenotomised muscle is excessive and dangerous. In a few cases of high grade squint, when one eye only could be operated upon, I have tenotomised the antagonist *one week after* the reefing advancement. That is, I think, good practice, only it means a second operation at a time when the patient feels the effects of the first. Recently, I have combined shortening of one tendon with lengthening of the antagonist by a method which will be described separately in the columns of THE OPHTHALMOSCOPE.

Conclusion.—There are advantages attending this operation which become evident in practice. It is practically bloodless, so the operator sees what he is doing, even though the tendon is covered by the conjunctiva. Further, the preservation of the alignment of the tendon in the absence of a section of the tendon, and the simplicity of the means taken to reef the tendon, give the operator a feeling of perfect control over the case. Whatever the ultimate result may be he feels he is doing what he wants to do easily and without hitch or uncertainty. Finally, in case of failure, the operation can be repeated on the same tendon.

N. BISHOP HARMAN.

VII.—REMEDIES.

(NINTH NOTICE.)

(1) Kuffler, Otto.—Serum diagnosis and serum therapy in ophthalmology. (Ueber Serodiagnostik und Serotherapie in der Augenheilkunde.) Vossius's *Sammlung zwangloser Abhandlugen*, Bd. VIII, Heft vi.

(2) Mitchell, Leonard J. C.—A report on the use of carbon dioxide snow in ophthalmic work. *British Medical Journal*, November 4th, 1911.

(3) Lagrange.—The treatment of trachoma. (Traitement de l'ophtalmie granuleuse.) *L'Ophtalmologie Provinciale*, janvier, 1912.

(4) Hawley, Clark W.—Trachoma treated with jequirity. *Journal of Ophthalmology and Oto-Laryngology*, February, 1912.

(5) Kaz, R.—Yellow precipitate ointment and caustic applications in acute conjunctival catarrh. (Die gelbe Präzipitatsalbe und Lapisbeizungen bei akuter Bindehautentzündung.) *Klin. Monatsbl. f. Augenheilkunde*, Mai, 1912.

(6) Knapp, Paul.—The influence of massage on the tension of normal and glaucomatous eyes. (Ueber den Einfluss der Massage auf die Tension normaler und glaukomatöser Augen.) *Klin. Monatsbl. f. Augenheilkunde*, Juni, 1912.

(7) de Waele.—On the treatment of nicotine amblyopia by lecithin. (Sur la médication de l'amblyopie nicotinique par la lécithine.) Second communication. *Archives d'Ophtalmologie*, juin, 1912.

(8) Weekers, L.—The use of calcium salts in the treatment of glaucoma by internal medication. (Emploi des sels calciques dans le traitement interne du glaucome.) *La Clinique Ophtalmologique*, 10 juin, 1912.

(9) Chevallereau, A.—Iodide lotions in the treatment of cataract. (Les collyres iodurés dans le traitement de la cataracte.) *La Clinique Ophtalmologique*, 10 juin, 1912.

(10) Toczyski, F.—On the influence of dionine on the behaviour of the pupil and the tension of normal eyes. (Ueber die Einfluss des Dionin auf das Verhalten der Pupille und der Tension normaler Augen.) *Zeitschrift für Augenheilkunde*, Juli, 1912.

(11) Abadie.—On ocular tuberculosis and its treatment. (De la tuberculose oculaire et de son traitement.) *Archives d'Ophtalmologie*, juillet, 1912.

(12) Smith, Henry.—The treatment of the early stages of senile cataract. *Archives of Ophthalmology*, July, 1912.

(13) Bellencontre.—A contribution to the study of Salvarsan in ocular therapeutics. (Contribution à l'étude de Salvarsan en thérapeutique oculaire.) *La Clinique Ophtalmologique*, 10 juillet, 1912.

(14) Fradking, S.—Two cases of infective ulcer of the cornea considerably improved by paraspecific serum therapy. (Deux cas d'ulcères infectieux de la cornée considérablement améliorés par la sérothérapie paraspécifique.) *La Clinique Ophtalmologique*, 10 juillet, 1912.

(15) **Darier, A.—On tuberculins in ocular therapeutics. (Des tuberculines en thérapeutique oculaire.)** *La Clinique Ophtalmologique*, 10 août, 1912.

(16) **Abadie, Charles.—On ocular tuberculosis and its treatment. (De la tuberculose oculaire et de son traitement.)** *La Clinique Ophtalmologique*, 10 août, 1912.

(17) **Nance, Willis O.—Ointment scarlet red in the treatment of eye diseases.** *Therapeutic Gazette*, August 15th, 1912.

(18) **Holroyd, J. B. H.—The treatment of styes.** *Brit. Med. Journal*, August 31st, 1912.

(1) In this paper **Kuffler,** of Giessen, reviews the subject of serum diagnosis and serum therapy in its application to ophthalmology, and at the same time tries to show how far the results are consistent with the various theories which have been offered by different observers. It does not contain anything that is new or original, nor does it lend itself to abstracting, but it is an able and lucid exposition of the subject, and worthy of being read in the original. A useful bibliography is given. A. J. BALLANTYNE.

(2) **Mitchell,** of London, believes that solid carbon dioxide is of use in everyday ophthalmic treatment. He has found it of service in follicular conjunctivitis, trachoma, rodent ulcer, nævi of the skin of the eyelids, "lymphatic nævi" of the conjunctiva, and spring catarrh, and as the result of his experiences has reached the following conclusions:

1. It apparently cures rodent ulcers when bone is not involved.
2. It relieves all cases of trachoma, and cures about 20 per cent.
3. It cures nævi of all types, and is therefore of considerable value in ophthalmic practice. SYDNEY STEPHENSON.

(3) In a clinical lecture on this subject, **Lagrange,** of Bordeaux, emphasizes the value of copper sulphate, used for a prolonged period, except in cases of suppuration, when silver nitrate is advised, to be followed by the former substance. The chronic cases should have the mucous membrane curetted and scraped, then brushed with 1-500 sublimate of mercury solution. He describes the operation in four stages. With regard to complications, several operations are mentioned for the purpose of altering the curve of the tarsal plate, and changing the direction of the lashes. Peritomy is recommended in preference to excision of pannus.

A. P. HARRY.

(4) After having suffered many thing of many physicians, this form of treatment was adopted, the patient being a lady aged thirty. The result was excellent, V.A. improving from 3/60 to 6/6 (corrected). Three other cases have been treated, and the results promise well. Dionine is used in the later stages of the course to aid in clearing the cornea.

HENRY L. G. LEASK.

(5) Considering epidemic conjunctivitis not as a bacteriological, but as a clinical entity, characterised by swelling of the lids and transition-folds, hyperæmia of the bulbar conjunctiva, conjunctival hæmorrhages, phlyctens, etc., **Kaz,** of St. Petersburg, considers yellow precipitate ointment so efficient that it brings the symptoms to an end in three or four days. In acute cases without involvement of the bulbar conjunctiva, he recommends pencilling with 1 per cent. silver nitrate, or the home use of 0.2 per cent. solution as drops. For subacute cases, he uses zinc sulphate drops and boric ointment. A. J. BALLANTYNE.

(6) The massage employed by **Knapp,** of Basle, was the "pressure massage" of Domec. This consists in applying the thumb to the cornea

through the closed lid, and making repeated pressures on it at a rate of about 100 to the minute. In his experiments, tonometer readings were made before pressure was applied, then after 200, 500, and 1,000 pressures, then every quarter of an hour for about an hour. His investigations deal with 73 eyes of 41 patients. He concludes that massage of the normal eyeball produces, in a few minutes, a pronounced fall of tension. (In his 41 cases an average fall of 8.91 mm. after 1,000 pressures.) Within three quarters of an hour, the tension, as a rule, returns to normal, but the time required is variable. No increase of the albuminous constituents of the aqueous is produced by massage. In acute glaucoma there is no effect, but in slight glaumatous attacks and in glaucoma simplex, there is almost always a fall, which, however, disappears in about fifteen minutes. A more pronounced and more durable effect is caused in eyes which have been operated on for glaucoma, and massage may be recommended as after-treatment to increase the filtering capacity of the cicatrix. In a few cases of glaucoma an actual rise of tension was caused by massage. Repeated use of holocaine causes reduction of the tension in many normal eyes. A. J. BALLANTYNE.

(7) **de Waele**, of Ghent, adds five cases of tobacco amblyopia to the two already reported by him, and is satisfied as to the superiority of lecithin over strychnine. The cases show that an improvement in the early stages can be effected rather more rapidly, although to obtain anything like a cure, from 13 to 15 weeks are necessary. The injections may give rise to local reactions necessitating suspension for a time. Merck's preparation of lecithin suspended in physiological solution is well borne, even in a dose of .5 gm.

BERNARD CRIDLAND.

(8) It will be of much interest to ascertain whether the observations of **Weekers**, of Liège, can be confirmed. Basing his experiment on the observations of Chiari and Januschke, who showed that, in general, the salts of calcium have a suspensive action on the processes of transudation and exudation in the skin, serous membranes, and mucous membranes, Weekers tried the effect of the internal administration of calcium chloride in two cases of glaucoma in which, for one reason or another, operation was not possible. In both the cases the ordinary local treatment by myotics had been quite unsuccessful, while the effect of the administration of the calcium chloride on the tension was very marked. The dose administered was 3 grammes per day, divided into three doses. Weekers points out that the medicine should be made up fresh every three days, as it does not keep well.

With regard to the mode of action of the calcium salts, Wright has already shown that they increase the viscosity and the coagulability of the blood. In addition to this influence, Chiari and Januschke have insisted on another fact, namely, that the salts of lime have an action on the permeability of the vessels. The wall of the vessel becomes more permeable owing to the removal of lime, less permeable as the result of its addition.

The influence of the salts of lime on the processes of exudation and transudation is a specific one. Negative results are obtained with the corresponding salts of strontium.

The following references are given by Weekers :—

1. **Chiari and Januschke.**—"Hemmung von Transsudat und Exsudatbildung durch Kalciumsalze." *Archiv für Experimentelle Patholog. und Pharmac.*, Bd. LXV, S. 120.
2. **Wright, A. E.**—*Lancet*, 19th September, 1896, p. 107, and 18th January, 1896, p. 153.
3. **Herbst.**—*Archiv für Entwiklungsmechanik*, Bd. IX, S. 424.
4. **Koch, R.**—*Schmiedeberg's Archiv*, Bd. XIV, S. 153.

ERNEST THOMSON.

(9) The article by **Chevallereau**, of Paris, is very interesting. Some strong statements have been made by others, notably by L. Dor, on the value of the local treatment of incipient cataract. Without going so far as Dor, Chevallereau is convinced from very long experience that good can be done in certain cases by the use of iodide of sodium (preferably) or of potassium. His conclusions are best given in his own words :

"Cataract can, in very rare and ill-defined cases, improve spontaneously or even become cured without operation. Treatment by iodide lotions is the one which best allows of these results. Iodide of sodium is better borne than iodide of potassium ; but, sometimes, owing to its ready decomposition, it causes a colouration of the conjunctiva reminiscent of argyrosis. Instillation of two drops morning and evening gives as good a result as the prolonged eye bath. With a collyrium (which in French refers to "drops," not to bathing) containing 50, 60, or 70 centigrammes of iodide of sodium, or of potassium, to 10 grammes of water, used for several years, one will obtain in a few rare cases a complete cure of an incipient cataract, often a partial disappearance of the opacities with improvement of visual acuity, and, perhaps still more frequently, will be able to maintain the visual acuity of stationary cataracts as well as when the latter are not the object of any treatment at all (*et peut-être plus souvent le maintien des cataractes à l'état stationnaire que lorsque celles-ci ne sont l'objet d'aucun traitement*)." ERNEST THOMSON.

(10) **Toczyski,** of Lemberg, after having put dionine into twelve eyes with normal tension and then tested them with the Schiötz tonometer, comes to the following conclusions :—

Dionine evokes a longer or shorter contraction of the pupil, which is generally followed by dilatation.

The myosis varies within wide limits and goes hand in hand with the degree of chemosis. The mydriasis, on the other hand, does not vary much.

The duration of the mydriasis is not dependent upon the duration of the myosis.

Intraocular tension begins to rise after the use of dionine shortly to fall again to normal or below it.

As long as the pupil is small, the tension will be found to be raised.

The dilatation of the pupil does not allow us to form any opinion of the tension, for it may be at this stage raised, normal, or diminished.

T. HARRISON BUTLER.

(11) **Abadie**, of Paris writes, in favour of the purely medical treatment of ocular tuberculosis, which consists in his hands of the internal administration of iodogenol (30 to 40 drops daily), daily inunctions with guaiacolised cod-liver oil, and a diet of raw meat or one of the meat-juices, according to the pocket of the patient. The success he has thus obtained makes him regard the method as being almost specific in its action. It may well be combined with tuberculin injections, which given alone afford results that, in his opinion, are brilliant but uncertain.

In cases complicated by syphilis, hereditary or acquired, the medical treatment can be combined with mercurial injections with much advantage. Several satisfactory cases are briefly recorded. BERNARD CRIDLAND.

(12) By accident, **Smith**, of Amritsar, discovered that an injection of cyanide of mercury subconjunctivally (strength 1 in 4,000, dose 20m.) had the effect of considerably improving vision in a case of cataract. He then tried the same treatment on several other cases and these he now reports. In eight cases, each one showed improvement in vision, in some cases, of a remarkable kind. These results are obtained with one injection. Cases most

suitable for injection are those in which vision is not reduced below 30 per cent. The eye looks very ugly for several days after injection, but after a few weeks, resumes its normal appearance. Smith has never seen any evil results from the injections. The improvement was first noticed in these patients on the third or fourth day, and it goes on steadily for about a month. Time will show, Smith remarks, if this improvement be permanent.

ROSA FORD.

(13) After reading the article by **Bellencontre**, of Paris, and reading also between the lines of the conclusions he draws, one cannot but feel that he is disappointed at the poor results he has obtained in the forty cases of ocular syphilis in which he used Salvarsan. He is able to say that no serious accident was caused, that no case was aggravated by the Salvarsan, but the remainder of the conclusions relapse into apologies for our want of knowledge of how to use the drug and how to regulate the dose, for its comparative inefficiency, since the dose has had to be reduced for safety sake, and for the possible imperfections of the drug. Then we have the crowning disappointment of learning that the treatment by Salvarsan, like that by mercury, should be prolonged if it is to be efficaceous. ERNEST THOMSON.

(14) **Fradking** relates two cases of infective corneal ulcer in which the administration of the antidiphtheritic serum of Roux seemed undoubtedly to have a most beneficial influence. Unfortunately, a bacteriological investigation of the ulcer does not seem to have been made in either case, which robs the communication of some of its importance.

ERNEST THOMSON.

(15) This paper by **Darier**, of Paris, is a somewhat general one. He begins by recounting what success he has had with a small number of cases of his own, and proceeds to discuss the various tuberculins with the view of bringing out which are the best. Of his own thirty cases, all observed for a long enough time, twenty-five results were positive and five were negative. It is admitted that such small statistics do not appeal very much to a reader, and yet to the clinician himself, watching his cases day by day, month by month, and year by year, it becomes evident that in tuberculin therapy we have a powerful means of stimulating the defences of the organism. We must not demand the impossible. We cannot cure all ocular tuberculosis with tuberculin any more than we can cure all syphilis with mercury or Salvarsan. The truth is we have not at the present day found a curative serum for tuberculosis: we can only stimulate the resistance of the organism to tuberculous infection.

Darier then passes in review the various tuberculins and appears to conclude that the two safest are B.E. and Endotine. He states the manner of diluting the original flask of B.E. which contains 1 mgr. of bacillary substance in 1 cc. He begins with the sixth dilution of this, injecting a fifth of a cc., that is, one-fifth of a millionth of a milligramme of bacillary substance. Even such minute doses are not always supported, and in such cases Darier resorts to Endotine, and when after a month or two he has arrived at large doses thereof, he recommences he treatment with B.E., which is then quite well borne.

The article ends with some remarks as to still newer preparations which are being studied at present by Wolff-Eisner, Rosenbach, and Metchnikoff, about which, however, the author does not wish in the meantime to speak fully.

ERNEST THOMSON.

(16) As regards the diagnosis of ocular tuberculosis, **Abadie**, of Paris, has already insisted upon fine vascularization of the iris and cornea, and upon the rugose and depolished appearance of the cornea as diagnostic points. He considers also that tuberculous synechiæ have often special characteristics. Instead of remaining sub-iridal and limited to the free border of the iris, they

encroach on the lens in such a way as to form fine denticulations which seem to draw the iritic tissue itself towards the centre of the pupil. The main object of the present article is not diagnosis, but treatment, and Abadie holds a special brief for a certain specific line of therapy, namely, the internal administration of iodogenol, daily massage with guaiacolized cod-liver oil, and raw meat. The iodogenol is given in a dose of 30 to 40 drops per day. Guaicolized cod-liver oil has the following composition:—

Cod-liver oil	120 grammes.
Guaiacol	15 grammes.
Essence de citronnelle	4 grammes.

One or two soup spoons of this are to be used after the fashion of a liniment. The raw meat is to be taken in quantities of from 60 to 100 grammes per day, or meat juice may be taken instead of the raw meat. Carnine may be prescribed to those able to pay for it.

This method of treatment has the undoubted disadvantage of being very slow, so slow that both patient and physician are apt to be discouraged and to change the treatment. For this reason, Abadie has tried tuberculin treatment, and has been satisfied with it on the whole. He has sometimes combined the two treatments, with excellent results. Nor must one forget that syphilis and tubercle may be associated, and here again one can combine the mercurial treatment with that just stated for tubercle.

All operative treatment should be avoided, if at all possible, in ocular tuberculosis. Ernest Thomson.

(17) **Nance**, of Chicago, employs scarlet red ointment (the strength of which he omits to state) in ulcers or perforating wounds of the cornea, as well as in conjunctival injuries, loss of corneal tissue from pterygium operations, and in loss of the integument of the eyelids. The remedy is used twice a day, and a bandage is applied. No irritation follows use of the ointment, which is inexpensive. Sydney Stephenson.

BOOK NOTICES.

The Treatment of Short Sight. By Professor Dr. J. Hirschberg. Translated by G. Lindsay Johnson, M.D., F.R.C.S. London: Rebman Limited, 1912. pp. 123. Price 5/- net.

The original German edition of Professor Hirschberg's essay on Myopia, *Die Behandlung der Kurzsichtigkeit*, was reviewed at considerable length in The Ophthalmoscope for October, 1910, by the late Mr. Henry Power, and requires no further comment.

The translation has been most lucidly made by Dr. Lindsay Johnson, who deserves the thanks of the profession for bringing within the reach of those to whom German is a standing difficulty the work of the eminent Berlin ophthalmologist. Ernest Thomson.

The Eye and Spectacles. (Das Auge und die Brille.) By Dr. M. VON ROHR. Leipzig: B. G. Teubner. 1912. Price 1 Mark.

This little book of 100 pages and 84 illustrations is interesting chiefly for the reason that the author attacks his subject along unusual lines. Dr. von Rohr is scientific adviser in the firm of Carl Zeiss, of Jena, and it is easy to trace his knowledge of the properties of optical instruments in his choice of problems connected with the eye and spectacle lenses.

He treats the eye simply as an optical system of lenses, diaphragm, and screen; almost without reference to physiology, and entirely without any consideration of the therapeutic value of spectacles. He demonstrates the significance of the nodal points, and how their position is affected by accommodation. He examines the minimum limit of perception, and the conditions for the estimate of depth in monocular vision. His minute examination of the ocular conditions of perspective might furnish some useful hints to anyone engaged in the study of the stereoscopic perception of distance. In treating of spectacle lenses, he shows the importance of the position of the lens in relation to the front focal plane of the eye system, and how upon its position are dependent the effective refractive power, the apparent position to the object, and the size of the retinal image. He gives much space to a demonstration of the qualities of oblique pencils, centric and excentric, emphasises the importance of their consideration in spectacle work, and shows how their ill-effects may be more or less corrected by the form of the lens. In this connexion he instances the periscopic forms advocated by Ostwalt and by Wollaston, defining the latter as a lens whose surfaces approximate to an arc with radius equal to the distance between the centre of rotation of the eye and the front focal point in the axis of the eye system. He advocates this form of lens as approximating nearest to a correction for barrel distortion, but admits that there is no absolute correction for this form of aberration except by a combination of lenses.

In the circumstances it is natural that he has much to say of the advantages of the double lens spectacles which have lately been introduced by the firm of Carl Zeiss. These consist of a convex objective and a concave eye piece, arranged on the principle of a Galilean telescope, and set in a spectacle frame. As a paper proposition, the spectacles approach perfection, but Dr. von Rohr is quite fair in pointing out their disadvantages, which may be summed up as (*a*) weight, (*b*) appearance, and (*c*) limitation of field.

A few pages devoted to spectacle frames contain nothing new, and fall distinctly below the level of the rest of the book. W. A. D.

Ophthalmic Nursing. By SYDNEY STEPHENSON. Third edition. 229 pp. Eighty illustrations. London: The Scientific Press, Ltd., 28 and 29, Southampton Street, Strand, W.C. 1912. Price 3s. 6d. net.

Sydney Stephenson's book, *Ophthalmic Nursing*, now in its third edition, is too well known to call for detailed comment. It should be in the hands of every nurse who is engaged in eye work, whether she be a beginner or be already possessed of experience. The book is thoroughly modern and up-to-date. The directions given and the careful explanations offered are in such plain and simple language that no woman of ordinary intelligence will have any difficulty in understanding everything she reads in it. The author has avoided everything in the nature of "faddism."

We feel sure that the third edition will enjoy a popularity among the nursing profession even greater than that of the former editions, and we may be allowed to add that most ophthalmic practitioners can themselves obtain considerable benefit from its perusal. It is not given to all to appreciate ophthalmology as it appears to the nurse in the way Mr. Stephenson has succeeded in doing.

S. E.

THE OPHTHALMOSCOPE DIARY.

1912.

Midland Ophthalmological Society.	Dec. 3rd (4.30 p.m.)	Eye Infirmary, Nottingham.
Section of Ophthalmology, *Royal Society of Medicine.*	Dec. 4th (8.30 p.m.)	1, Wimpole Street, London,

1913.

Midland Ophthalmological Society.	Feby. 4th (5.30 p.m.)	Birmingham and Midland Eye Hospital.
Section of Ophthalmology, *Royal Society of Medicine.*	Feby. 5th (8.30 p.m.)	1, Wimpole Street, London.
Section of Ophthalmology, *Royal Society of Medicine.*	March 5th (8.30 p.m.)	1, Wimpole Street, London.
Midland Ophthalmological Society.	April 1st (5.30 p.m.)	Birmingham and Midland Eye Hospital.
Ophthalmological Society of the United Kingdom.	April 24th and 26th	London.
French Ophthalmological Society.	May 5th	Paris.
Section of Ophthalmology, *Royal Society of Medicine.*	May 7th 8.30 p.m.	1, Wimpole Street, London.
Midland Ophthalmological Society.	June 3rd 4.30 p.m.	Shrewsbury.
Section of Ophthalmology, *Royal Society of Medicine.*	June 4th 8.30 p.m.	1, Wimpole Street, London.
Oxford Ophthalmological Congress.	July 16th to 18th	Keble College, Oxford.

1913—continued.

Section of Ophthalmology, *British Medical Association.*	July	Brighton.
Ophthalmologische Gesellschaft.	August	Heidelberg.
Section of Ophthalmology, *XVIIth Int. Congress of Medicine.*	August 7th to 12th	London

NOTES AND ECHOES.

Deaths.

WE regret to announce the death, which took place on November 6th, at Donnybrook, Dublin, at the age of 60 years, of Dr. Arthur H. Benson, the well-known ophthalmologist. Dr. Benson had been suffering for about a year from cardiac mischief. He was educated at Trinity College, Dublin, where he graduated as bachelor of medicine in 1876. He then studied under some of the more prominent ophthalmic surgeons on the Continent of Europe. In

DR. ARTHUR H. BENSON.

1881 he obtained the Fellowship of the Royal College of Surgeons in Ireland, and two years later, was appointed ophthalmic surgeon to the Royal City of Dublin Hospital, a post he retained until his demise. He was also surgeon to the Royal Victoria Eye and Ear Hospital. For a period of many years Dr. Benson was examiner in ophthalmic medicine and surgery in the University of Dublin. He was a member of the Oxford Ophthalmological Congress, as well as of the Ophthalmological Society of the United Kingdom, and had served as vice-president of the last-named body from 1901 to 1903. Mr. Benson was president of the Pathological Section of the Royal Academy of Medicine in Ireland from 1909 to 1911.

We offer sincere condolences to Mrs. Benson, and to Mr. Benson's brother, Sir Hawtrey Benson, president of the Royal College of Physicians in Ireland.

An interesting and most lovable personality has passed away in Dr. Henri Dor, of Lyons, formerly professor of ophthalmology in the University of Berne. Death occured on October 28th last in his 78th year. Dor was born at Vevey in 1835. He pursued his medical studies at the University of Zürich. After that, he travelled widely, working with Master after Master. He studied with Jaeger at Vienna, with Sichel and Desmarres at Paris, with Bowman and Critchett at London, and in Edinburgh, where he met the famous William Mackenzie. During the eighteen months he spent in Berlin, he formed a close friendship with von Graefe, and became, indeed, one of his

Dr. HENRI DOR.

favourite pupils. He next visited Donders, and the writer of this notice has heard him tell the tale that the day after his arrival at Utrecht, Donders, in addressing his students, said: "Gentlemen, we are honoured to have among us a doctor from foreign parts. After to-day I shall address you in French." Dor replied that such was not necessary, for he would quickly understand Dutch. But Donders simply remarked that the University of Utrecht was open to all the world, and that if a German came to-morrow and an Englishman the day after that, he would give his lectures in German or in English. "For," as he added, "our students should know those three languages" . . . Dor settled as an ophthalmic surgeon at Vevey in 1860. Seven years later the chair of ophthalmology at Berne was offered to, and accepted by, Dor. In 1876 he migrated to Lyons, and despite the fact that Gayet obtained the chair of ophthalmology in the new Faculty of Medicine, Dor remained there until the time of his death only the other day. With the aid of friends, Dor founded a *clinique*, in which he cared for 35,014 patients between the years 1877 and 1912. Dor was a high priest of Esperanto, which was perhaps the more singular since he could speak seven or eight living languages, to say nothing of several dead ones. His linguistic accomplishments were indeed one of the remarkable things about this most remarkable man. Esperanto, however, represented but one of Dor's many activities. In conjunction with the late Dr. Edouard Meyer, of Paris, he founded in 1882 the *Revue Générale d'Ophtalmologie*, of which he retained the editorial chair until his death. In the earlier days of the periodical, Dor undertook to analyse all foreign contributions to ophthalmology, a task for which his acquaintance with foreign tongues eminently fitted him. Dor was a member of many learned societies, ophthalmological and otherwise. It will suffice here to say that he was a co-founder of the Heidelberg Congress and of the French Ophthalmological Society, and was, besides, a foundation member of the Oxford Ophthalmological Congress. Dr. Dor was a chevalier of the Légion d'Honneur and of the Mérite Agricole. His other decorations included the Orders of Gustave Wasa and of the Danebrog.

In March last Professor Dor's jubilee was celebrated by the presentation of an artistic *plaquette*, the gift of his friends, pupils, and admirers.

To his son, Dr. Louis Dor, we extend sincere sympathy.

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Appointments. MESSRS. G. A. Berry, G. Mackay, W. G. Sym, and J. V. Paterson have been appointed examiners in ophthalmic surgery for the Fellowship of the Royal College of Surgeons of Edinburgh.

Mr. E. C. Temple-Smith, D.O. Oxon., has been appointed ophthalmic surgeon to the Liverpool State Hospital and Asylum for the Infirm, Sydney, New South Wales.

Dr. H. Neville Crow has been appointed surgeon to the Worcester Ophthalmic Hospital, vice Dr. Harold F. Seymour, resigned.

Mr. F. A. Newman, D.O. Oxon., has been appointed oculist to the Melbourne Benevolent Society.

Dr. Bielshowsky has been nominated professor of ophthalmology and director of the University *Augenklinik* at Marburg.

Dr. H. Frenkel has been appointed professor of ophthalmology at Toulouse in succession to Terson (père).

Dr. O. Pes, of Cagliari, has been appointed extraordinary professor of ophthalmology in the University of Modena.

Dr. Leser has been recognized as *privat-dozent* of ophthalmology in the Czech University of Prague.

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Distinctions.

THE honorary degree of LL.D. has been bestowed by the University of Bristol upon Mr. E. Richardson Cross.

The title of professor has been bestowed upon Dr. Bartels, of Strasburg, and Dr. Krusius, of Berlin.

* * * *

Committee on Colour Vision.

A COMMITTEE on colour vision and colour blindness has been appointed by the British Association. It consists of Professors E. Gotch, Leonard Hill, A. W. Porter, and A. D. Waller, together with Professor E. H. Starling as chairman and Dr. F. W. Edridge-Green as secretary. Its appointment appears to be somewhat of a reflection upon the Board of Trade Committee on sight tests, the report of which was adversely criticised in the September number of THE OPHTHALMOSCOPE.

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The Nettleship Prize.

CONGRATULATIONS to Mr. George Coats, to whom the Nettleship Prize of the Ophthalmological Society of the United Kingdom has been awarded in recognition of his valuable work on ocular pathology.

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Erratum.

IN the last number of THE OPHTHALMOSCOPE it was announced by error that Dr. William Sweet had been appointed to "the chair of ophthalmology in the Jefferson Medical College, Philadelphia, Pa." Dr. Howard F. Hansell holds the chair of ophthalmology, and Dr. Sweet's appointment is that of clinical professor.

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